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ABSTRACT

The University of Pittsburgh Program for the Study of Knowledge Use is conducting methodological research on knowledge use and school improvement. The Pittsburgh Program, established in 1978, is an interdisciplinary program designed to conduct research, provide instruction, and offer technical services. Specifically, the purposes of the program are: (1) to conduct research on the production and use of research-based and experiential knowledge by policymakers, practitioners, and other stakeholders in issues areas ranging from education, mental health, and criminal justice to productivity and performance improvement, program evaluation, and social planning and policy; (2) to offer an integrated program of instruction that promotes capacities to understand, critique, synthesize, package, and disseminate knowledge and skills appropriate for improving the production and use of knowledge in the public and private sectors; and (3) to build a network of university-practitioner relationships that enables a timely and appropriate response to needs for consultation, technical services, and training in strategies for deliberately enhancing the use of available knowledge to alleviate practical problems. Eleven individual papers examine aspects of the program such as the conceptual design, relevant literature, research contexts, qualitative procedures, study of knowledge networks, and methodological choices. (Author/PN)

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PROGRAM FOR THE STUDY OF KNOWLEDGE USE

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METHODOLOGICAL RESEARCH ON KNOWLEDGE USE AND SCHOOL IMPROVEMENT

Volume II: Conceptualizing Knowledge Use

August 1982

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I KNOWLEDGE USE AND SCHOOL IMPROVEMENT CONCEPTUAL FRAMEWORK AND STUDY DESIGN

William N. Dunn and Burkart Holzner

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Study Design
Research Products and Their Significance

ABSTRACT

The University of Pittsburgh Program for the Study of Knowledge Use is now conducting methodological research on knowledge use and school improvement under a grant from the National Institute of Education. The purposes of this working paper are (1) to identify traditions in the study of knowledge use that have shaped the conceptual framework and research platform of the Pittsburgh Program; (2) to outline the three major research problems that the project seeks to alleviate; (3) to specify the research objectives and study design that guide project activities; and (4) to provide a brief overview of research products and their significance.

INTRODUCTION

The University of Pittsburgh Program for the Study of Knowledge Use is now conducting methodological research on knowledge use and school improvement under a grant from the Research and Educational Practices Program, National Institute of Education. The Pittsburgh Program, established in 1978, is an interdisciplinary program designed to conduct research, provide instruction, and offer technical services. Specifically, the purposes of the program are:

(1) to conduct research on the production and use of research-based and experiential knowledge by policymakers, practitioners, and other stakeholders in issue areas ranging from education, mental health, and criminal justice to productivity and performance improvement, program evaluation, and social planning and policy;

(2) to offer an integrated program of instruction that promotes capacities to understand, critique, synthesize, package, and disseminate knowledge and skills appropriate for improving the production and use of knowledge in the public and private sectors; and

(3) to build a network of university-practitioner relationships that enables a timely and appropriate response to needs for consultation, technical services, and training in strategies for deliberately enhancing the use of available knowledge to alleviate practical problems.

TRADITIONS IN THE STUDY OF KNOWLEDGE USE

The Pittsburgh Program draws from several complementary traditions in the study of knowledge use. The first and most important of these is the tradition of applied social science established by the late Paul Lazarsfeld. Throughout his long and innovative career Lazarsfeld persuaded social scientists to take their cues from practice, rather than seek to build social science disciplines by emulating colleagues in the natural sciences (see Lazarsfeld, 1972; Lazarsfeld and Reitz, 1975; Holzner, Marx, and Fisher, 1977).

This tradition, which challenges and reverses the sequence implied by a "basic-to-applied" research cycle, emphasizes the dependence of social science disciplines on the results of experience acquired in the course of investigating practical problems. Paraphrasing Kurt Lewin: "nothing is more conducive to innovation in social theory than collaboration on a complex practical problem" (Lazarsfeld and Reitz, 1975:10).

A second important tradition is the sociology of knowledge. In contrast to classical sociology of knowledge, which focused on the social bases of intellectual productions, the Pittsburgh group is oriented towards a multidisciplinary social science of knowledge applications (see Holzner, 1968; Holzner and Marx, 1979). While building upon the insights of classical contributors (Scheler, Mannheim, Weber), a social science of knowledge applications is committed to studying the social bases of knowledge production, organization, storage, dissemination, and use. In effect it is both a classical sociology of knowledge "turned upside down" (Holzner, 1978:8) and a basic social science of the applied social sciences (see Weiss and Bucuvalas, 1980:302).

A third important tradition is represented by the field of planned social change (see Zaltman, 1979). Proceeding from a recognition of manifest and latent consequences of change and innovation (Merton, 1949, 1976; Rogers and Shoemaker, 1971), the Pittsburgh group has addressed issues surrounding the meaning and measurement of "use." Here the central problem is one of determining whether surface characteristics of knowledge use--for example, the recognition of names of authors of scientific studies or self-reported instances of conceptual and/or instrumental uses of knowledge--actually induce intended changes in the structure and functioning of some social system. Thus, to take "use" at face value may blur important distinctions between knowledge inputs, outputs, and impacts, risking "the measurement of the number of times a bird flaps its wings without any attempt to determine how far it has flown" (Suchman, 1967:61).

A final important tradition is that of methodological and empirical studies of problem solving in the sciences and professions. Whereas many studies of scientific and professional problem solving implicitly assume that more knowledge will automatically alleviate problems, the Pittsburgh group proceeds from the general hypothesis that most social problems are sufficiently complex that any one knowledge "solution" is unlikely to succeed unless it is produced with a view towards capturing that complexity. Efforts designed to understand and improve professional practice must therefore recognize that many of the most important problems are ill-structured, messy, or squishy (Mitroff, 1974; Ackoff, 1974; Strauch, 1976). This means, among other things, that stakeholders in school improvement have conflicting standards for assessing knowledge-based innovations and their uses. Many failures and shortcomings of the applied social sciences may be traced to a trained incapacity to deal with ill-structured problems (Dunn, Mitroff, and Deutsch, 1981).

RESEARCH PLATFORM OF THE PITTSBURGH PROGRAM

The Pittsburgh Program draws from these complementary traditions in a systematic, critical, and focused way. Therefore, our aim is not to produce an eclectic combination of available traditions but to move towards a genuine synthesis. This is reflected in the interrelated methodological principles which together represent our research platform:

(1) Knowledge Use Is Interpretive: The study of knowledge use should explicitly address competing interpretations of knowledge held by

diverse stakeholders in educational improvement. Potentially transferrable knowledge products, whether research-based or experiential, do not "speak for themselves." It is, therefore, essential to surface and make explicit the frames of reference which transform information about educational innovations into conflicting assessments of knowledge adequacy, relevance, and cogency (Dunn, 1981; Weiss and Bucuvalas, 1980; Holzner and Fisher, 1979). The frames of reference of social scientists not only structure problems of professional practice (see Rein and Schon, 1977) but distort such problems in unfortunate ways (see Gregg _et al_., 1979). In effect, the frames of reference of policymakers and practitioners contain their theories-in-use (Zaltman, 1977), that is, experientially grounded theories which provide relatively more adequate accounts of knowledge use and planned change (see Dunn, 1980; Dunn and Swierczek, 1977) than do formal theories developed by social science disciplines.

(2) _Knowledge Use Is Socially Constrained_: The study of knowledge use cannot focus solely or exclusively on the interpretive dimension of knowledge, since frames of reference are constrained by social structures, roles, networks, and other institutionalized arrangements. Variations in knowledge use are shaped by formal structures, procedures, and incentive systems of organizations, "external linkages" which set opportunities and limits and thus establish a context for knowledge use (Rich, 1979:333-34). The relation between interpretive and social dimensions of knowledge use is nevertheless one of reciprocity: Frames of reference affect and are affected by the social and political structures in which knowledge becomes embedded, institutionalized, and legitimated.

(3) Knowledge Use Is Systemic: The study of knowledge use cannot confine itself to discrete instances of knowledge use, misuse, overuse, nonuse, and abuse. Problems of knowledge use are rarely decomposable into constituent elements or parts, since knowledge use is typically a whole system of problems that involves interdependent activities of production, organization, storage, retrieval, transfer, and application (Holzner and Marx, 1979). Because knowledge systems are complex, and their growth cumulative, it is sometimes easier to simultaneously investigate a score of interdependent problems than to study single problems sequentially.

(4) Knowledge Use Is Transactive: The study of knowledge use should not only build upon interpretative, social and systemic properties of knowledge, but should also recognize that processes of knowledge production and use are critical social transactions. Accordingly, knowledge is not "exchanged," "marketed," or "transferred," terms which suggest a one-directional process of moving discrete bits or configurations of information among parties who share an a priori common definition of "knowledge." On the contrary, knowledge is transacted among parties engaged in symbolic or communicative acts of negotiating the adequacy, relevance, and cogency of knowledge claims (Dunn, 1981b). This methodological principle extends to social researchers themselves as they transact knowledge research sponsors, research subjects, and the wider community. Hence, the process of individual and collective learning is dynamic, multidirectional, and based upon self-reflective or self-referential behavior where stakeholders uncover and critically examine repertoires of available standards for assessing the contribution of knowledge to the alleviation of practical problems.

THREE PROBLEMS OF KNOWLEDGE USE

A continuous review of methodological needs and opportunities in the field of knowledge use leads us to identify three problems which we deem vital to school improvement and other areas of policymaking and professional practice. These problems warrant special attention and urgent treatment by investigators in the field.

The Criterion Problem: What is "Use?". Traditionally, knowledge use has been viewed as a discrete process of appropriating new ideas or innovations for purposes of recommending and/or implementing specific courses of action (National Institute of Education, 1978). This traditional conception of knowledge use, which emphasizes directly observable consequences of acting upon knowledge, has led many researchers to inquire whether specific knowledge is overtly used and if results of implementation vary from site to site (Larsen, 1980:425).

With the advent of studies showing that "used" knowledge does not necessarily impact on decision making (e.g., Weiss, 1977; Rich, 1979) or result in the solution of policy problems (e.g., Cohen and Garet, 1975; Roessner, 1979), the concept of "use" has been reexamined, redefined, and differentiated. One broad but important distinction is between "conceptual," "instrumental," and "symbolic" uses of knowledge (Caplan et al., 1975; Rich, 1975; Knorr, 1977). More recently Leviton and Hughes (1981) have added the dimension of "persuasive" use. Similar distinctions are contained in alternative models of knowledge use, for example, problem-solving, knowledge-driven, interactive, political, engineering, and enlightenment models (Weiss, 1977). Knowledge use may also be represented in terms of overlapping contingency models whose key elements are the content, mode of acquisition, and problem-focus of knowledge and the structures and processes surrounding its creation, transfer, and application (Dunn, 1980). Finally, knowledge use may be differentiated in terms of several latent goals of evaluation and policy research, including legitimation, containment, subversion, and policing (Suchman, 1972; Rein and White, 1977).

These distinctions accentuate the complexity of knowledge use as a concept and highlight the importance of attaining a better understanding of its multiple dimensions. At present we lack an adequate understanding of what is meant by the term "use," even though it is taken as the criterion measure in both theoretical and normative models of knowledge use. Because the concept is conceptualized and measured in diverse and unclearly specified ways, it is not now possible to satisfactorily explain, predict, or control "use" and its antecedent conditions and consequences. In short, little is known about the most crucial concept in the field.

In the area of educational improvement this criterion problem may be illustrated by identifying the multiple uses of a single item of knowledge about teaching. A sample knowledge item might be that "interactive research and development on teaching (IR&DT)" increases in effectiveness when participating teachers have had similar past experiences with regard to innovation developments (Tikunoff, Ward, and Griffin, 1979:18). This knowledge may be used or not used in several ways: (1) educational R & D specialists may seek as participating teachers only those with similar past experiences; (2) school officials who are required (mandated) to use this approach against their preferences may deliberately seek teachers who lack similar past experiences; (3) educational policymakers may dismiss the finding because it is perceived as far too complex to implement; and (4) teachers may dismiss IR&DT because the originating R & D team did not include teachers with past experiences and backgrounds similar to their own.

This illustration suggests several dimensions of "use." The first case (educational R & D specialists) might be labelled a positive use of knowledge, even though the confinement of participants to those with similar experiences can also be considered a misuse of knowledge, for example, because those most in need of new experiences are excluded. The second case (school officials) suggests deliberate misuse of knowledge. Yet we may find that the selection of participants with dissimilar experiences represents a creative adaptation of the innovation to local circumstances. By contrast, while the third case (educational policymakers) suggests a simple instance of nonuse, it also points to the dual possibility of enlightened nonuse by policymakers and knowledge abuse by R & D developers who advocate innovations without satisfactory knowledge of the varied conditions under which it might be implemented. Finally, the fourth case (teachers) involves potential adopters who assess new knowledge on the basis of known uses of IR&DT by teachers like themselves. Teachers may have good reason to dispute the adequacy of the new knowledge (IR&DT), but for reasons that are experiential rather than research-based.

These instances of use, nonuse, abuse, and misuse point to the theoretical and practical importance of improving our understanding of knowledge "use":

(1) Are there _n_ different unidmensional concepts of use or is there a single construct with multiple dimensions? Or are there several distinct but nevertheless multidimensional constructs, for example, knowledge "input," knowledge "use," knowledge "output," and knowledge "impact?"

(2) How does the meaning of use vary, if at all, when the concept (whatever its dimensionality) is considered as an independent, intervening, or dependent variable? Is knowledge use properly conceived as an enabling objective, a terminal objective, or both? Are there hierarchies of knowledge use goals and objectives?

(3) Do the connotations and denotations of "use" vary with the meaning of "knowledge" itself? Under what specific conditions are data or evidence transformed into "knowledge?" Do different kinds of knowledge--for example, experiential vs. research-based and conceptual vs. instrumental knowledge--imply different types and contexts of use?

(4) How do the intended and actual uses of knowledge influence the initiation, maintenance, and termination of knowledge transactions among stakeholders in educational improvement?

The Problem of Diversity: Why Does Knowledge Vary in Relevance, Cogency, and Adequacy? Knowledge use is fundamentally interpretive. It depends on the diverse assumptions which different stakeholders in educational improvement employ to appraise knowledge. These diverse assumptions are organized in frames of reference, that is, systematically organized sets of explicit and implicit standards for assessing knowledge. Frames of reference involve what Holzner and Marx (1979:103-11) call reality or truth tests, or what Weiss and Bucuvalas (1980) term truth tests and utility tests.

Truth tests are decision rules or standards for interpreting data or evidence (Holzner and Fisher, 1979:233-34). By contrast, utility or relevance tests are decision rules or standards for delineating an appropriate domain of inquiry or action. Finally, cogency tests are decision rules or standards for establishing the relative force or confidence required of knowledge in particular circumstances (Dunn, 1981b).

Tests of truth, relevance, and cogency reflect diverse standards of assessment brought to bear in appraising educational innovations. Truth tests, which are standards for assessing the adequacy of knowledge claims, are sometimes based on scientific criteria shared by members of a research community.

In many other cases truth tests are based on the ordinary knowledge of successful practitioners. Tests of relevance, which are standards for assessing the appropriateness of knowledge claims, reflect the diverse purposes attributed to knowledge by educational policymakers, practitioners, researchers, community groups, and other stakeholders. These diverse purposes underlie contrasts between policy research and discipline-based research (Coleman, 1972, 1980), "macronegative" and "micropositive" research findings (Williams, 1971), and the "two-communities theory" of knowledge use (Caplan, 1979). Finally, tests of cogency are standards for assessing the force or confidence required of knowledge in circumstances calling for action. For example, school officials may use a stringent test of cogency in assessing results of achievement batteries which will be used to place students in classes or recommend them for jobs, but apply much less stringent cogency tests when evaluating the effects of established curricula on student learning.

Concepts of truth, relevance, and cogency raise a number of practical and conceptual questions:

(1) Do concepts of truth, relevance, and cogency exhaust the classes of standards used to certify and challenge knowledge claims? Can knowledge adequacy, appropriateness, and force be more precisely defined and specified?

(2) Can truth tests be differentiated, for example, into scientific, pragmatic, authoritative, and ethical rules or standards? What are the specific properties of these tests? Can we identify and measure their effects in specific contexts?

(3) Can relevance tests be differentiated according to specific purposes of stakeholders, including the description, evaluation, and recommendation of new policies and professional practices? What are the

specific properties of such tests of relevance and how can we identify and measure their influence?

(4) Tests of cogency are described in standard statistics texts in terms of confidence intervals and forms of statistical error (Type I and Type II Errors). Are there other ways to classify and measure the relative force expected of knowledge in particular contexts?

(5) Finally, is it possible to develop a comprehensive classification scheme or typology which not only differentiates broad classes of standards for assessing knowledge but isolates specific tests which are grounded in the frames of reference of different stakeholders in educational improvement?

The Multiattribute Problem: How Can We Measure the Complexity of Knowledge Appraisals? A typology of truth, relevance, and cogency tests assumes that classes of standards or rules, together with specific variants are independent. This assumption of independence may be tenable when the application of a relevance test does not guarantee that knowledge is sufficiently cogent or forceful, for example, in cases where members of the legal and medical professions acknowledge the relevance of medical reports but apply different cogency tests. The legal profession typically requires a stringent cogency test: Defendants are presumed innocent until proven guilty. The medical profession, by contrast, typically demands a minimal test of cogency: Treatment should err on the side of caution. In the first case the problem is to avoid "false positives," while in the second it is to avoid "false negatives."

In many other cases the adequacy, appropriateness, and requisite force of knowledge interact in complex and unknown ways. Multiple and potentially conflicting classes of truth, relevance, and cogency tests may be applied by the same person. Moreover, the distribution and relative importance of such tests may change over time as a result of knowledge transactions among stakeholders. While Weiss and Bucuvalas (1980) have correctly observed that the complexity of truth and relevance tests is analogous to problems encountered in multiattribute utility theory (e.g., Edwards, Guttentag, and Snapper, 1975) no one has yet attempted to develop procedures for measuring the complexity of knowledge appraisals:

(1) Can the distribution of truth, relevance, and cogency tests within and among stakeholders be identified and measured?

(2) Can truth tests be ranked according to their relative importance? If so, do they form an identifiable hierarchy? How might we measure the consistency of hierarchically ordered truth tests?

(3) How does the relative importance of differerent truth tests vary as a consequence of employing different relevance tests? Are measures of consistency affected by some types of relevance tests more than others?

(4) To what extent is knowledge cogency a function of the separate, combined, and interaction effects of different truth and relevance tests? How does the consistency of truth and/or relevance tests affect the requisite force of knowledge in particular circumstances?

(5) Finally, can cogency tests be employed as surrogates for the value or utility attached to knowledge? Does the concept of knowledge cogency permit subjective estimates of the value of new ideas of innovations to educational policymakers and practitioners? Can the "shadow" value of an educational innovation be assessed indirectly by measuring the requisite force of knowledge in given circumstances?

RESEARCH OBJECTIVES

In seeking to alleviate these three problems we are guided by three research objectives: the development of user-responsive research instruments; the creation of a grounded typology of truth, relevance, and cogency tests; and the elaboration of procedures to conduct decision-focused utilization studies.

User-Responsive Research Instruments. A major objective of the project is to develop a set of user-responsive research instruments to measure knowledge use. The development of such research instruments involves three interrelated tasks:

(1) Preliminary Mapping of Constructs: The first task involves a preliminary mapping of constructs that reflect multiple dimensions of knowledge use. A working universe of constructs is being identified on the basis of available surveys of theory and research on knowledge use and planned change conducted by members of the project team. Constructs are being grouped according to variations in use-related behavior (use, nonuse, disuse, misuse, abuse, overuse, underuse); temporal aspects of use (preconditional use, prerequisite use, enabling use, terminal use); and knowledge correlates of use (knowledge content, knowledge source, knowledge structure, mode of acquiring knowledge, adequacy of knowledge, requisite force of knowledge, relevance of knowledge).

(2) Definition and Operationalization: This second task requires that constructs in our working universe be defined constitutively and operationalized in multiple formats (self-administered questionnaires, open-ended and vignette-focused interview protocols, coding schemes). Alternative scaling and indexing procedures are now under consideration and available surveys (e.g., Weiss) and collections of instruments (e.g., Swierczek and Dunn, 1979) serve as potential guides.

(3) Pilot-testing and Provisional Validation: Instruments will be pilot-tested among selected educational policymakers and practitioners in Pittsburgh. Respondents will be chosen by attempting to maximize differences between formal positions, roles, functions, and involvement in various phases of the process of adopting educational innovations. Instruments will be pilot-tested in several ways, for example, by selecting stakeholders in the same events (events sampling), similar social networks (sociometric sampling), and common phases of the adoption process (phase sampling). Pilot-test results will be provisionally validated with appropriate procedures (e.g., face validation, factor validation, content validation, concurrent validation, construct validation). Since our objective is confined to instrument development issues of external validity are not directly relevant.

A Grounded Typology. The second main objective is the development of a grounded typology of standards for appraising knowledge. These standards-in-use are based on a preliminary classification of truth, relevance, and cogency tests developed by members of the research team. The typology is being developed at the same time as we complete the first task of instrument development (Preliminary Mapping of Constructs), since constructs of knowledge adequacy, relevance, and cogency are central to the conceptualization and measurement of "use." Elements of the typology will be defined, operationalized, pilot-tested, and validated as part of the latter two tasks of instrument development described above.

Decision-Focused Analytic Procedures. The third main objective is to develop procedures appropriate for analyzing the complexity of diverse standards for appraising knowledge. The focus of these analytic procedures is the use of knowledge to make various classes of decisions. In the tradition of Dewey and others (see O'Shaughnessy, 1973; Dunn, 1981a) we do not limit decisions to those which involve action but include: (1) decisions to denote, connote, and classify (definitive decision); (2) decisions to describe, explain, and predict (designative decision); (3) decisions to evaluate (evaluative decision); and (4) decisions to recommend a course of action or policy (advocative decision).

In analyzing such decisions we use the idea of frames of reference as a unifying construct. Truth, relevance, and cogency tests--three classes of components of frames of reference--are treated as multiple attributes of knowledge affecting decisions. The main task is to identify the presence of these attributes, rank them in order of importance, and measure their weighted and unweighted aggregate "decision" value to different stakeholders. For these purposes we are considering appropriate ways to adapt and apply multiattribute procedures used in marketing (e.g., Green and Srinivasan, 1978), program evaluation (e.g., Edwards, Guttentag, and Snapper, 1975), and other areas involving judgments about the utility of information (see Slovic and Lichten-Stein, 1971). In addition we are assessing the appropriateness of analytic hierarchy analysis, a unqiue set of procedures used to scale educational planning priorities and analyze the complexity of various hierarchies of attributes (Satty and Rogers, 1976; Saaty, 1977). Finally, we have begun to explore the extent to which certain concepts and procedures borrowed from applied economics and statistical decision theory may be applied to problems of estimating the use value of knowledge. These concepts and procedures include shadow pricing and minimax regret (see Savage, 1951).

STUDY DESIGN

To achieve these research objectives we have developed a study design with three distinguishable but interdependent components. Since the central thrust of the project is methodological, these design components are aimed at the generation of concepts and measures of knowledge. Only secondarily do we seek to validate results through field research.

Multiple Triangulation. The first design compenent is intended to provide answers to the question: What is knowledge "use?" Answers to this question are vital to the resolution of policy issues surrounding knowledge use and school improvement, since the way we define "use" determines conclusions about the effectiveness, efficiency, adequacy, and equity of federal investments in educational R&D efforts. If "use" is defined solely in terms of the overt and active appropriation of knowledge to alleviate some educational need, then many educational R&D efforts are likely to be assessed as marginally worthwhile or even as failures. Yet such negative conclusions may be challenged on grounds that there are other equally important definitions of use (Zaltman, 1980). For example, "use" may be defined as:

(1) Adaptation: New knowledge is modified in response to special problems or circumstances present in the environment of the user. For example, school districts may adapt testing procedures to local conditions.

(2) Segmentation: New knowledge may be segmented into parts, some of which may be used and others rejected, as is the case with many management innovations.

(3) Sedimentation: New knowledge may appear to be wholly ineffectual, since potential users can neither cite nor describe it in its original form (for example, a key scientific report or standardized system of instruction). In fact, parts of such knowledge have passed through successive phases of translation in the field of practice and sedimental users are unaware of the original source of their knowledge.

(4) Rejection: New knowledge may be rejected, but nevertheless used in a productive way to critically test and improve existing practices. Rejection may involve a kind of *a fortiori* ("with all the greater strength") logic where a new but intuitively disfavored knowledge source is systematically compared with an existing source which eventually withstands critical comparison and is also improved in the process.

(5) Displacement: New knowledge in the form of negative research findings ("X does not work") may displace current practices and promote the development of revised or improved local solutions, even though negative findings do not themselves contain knowledge which may be "used" to take direct action to resolve a problem.

(6) Synthesis: New knowledge may be juxtaposed to current practices, creating additional new knowledge that cannot be described in terms of the original juxtaposed components. The resultant synthesis goes beyond dichotomous choices between the adoption of new knowledge (K) and the maintenance of current practices (not-K) and represents a new form of use (not-K and not-not-K).

These alternative meanings of "use" pose a number of conceptual and instrumental problems whose resolution is critical for knowledge use and school improvement. If "use" is measured by the frequency of knowledge products cited by educators as important to decisions made within their respective domains of responsibility, then we will no doubt find that the relative frequency of "use" and "nonuse" is heavily skewed in the direction of the latter category. Even when continuous scales are employed to measure multiple dimensions of use, these scales are not likely to provide an accurate representation of adaptation, segmentation, sedimentation, rejection, displacement, and synthesis. For example, Larsen (1979) has developed a Utilization Quotient (UQ) of the form

$$UQ = \frac{\Sigma(St \times I \times Sc)}{N}; \text{ where}$$

St = the implementational status of information utilization as represented by its relative incorporation into decisions;

I = the influence of the knowledge provided in affecting utilization; and

Sc = the scope of resources required to use information

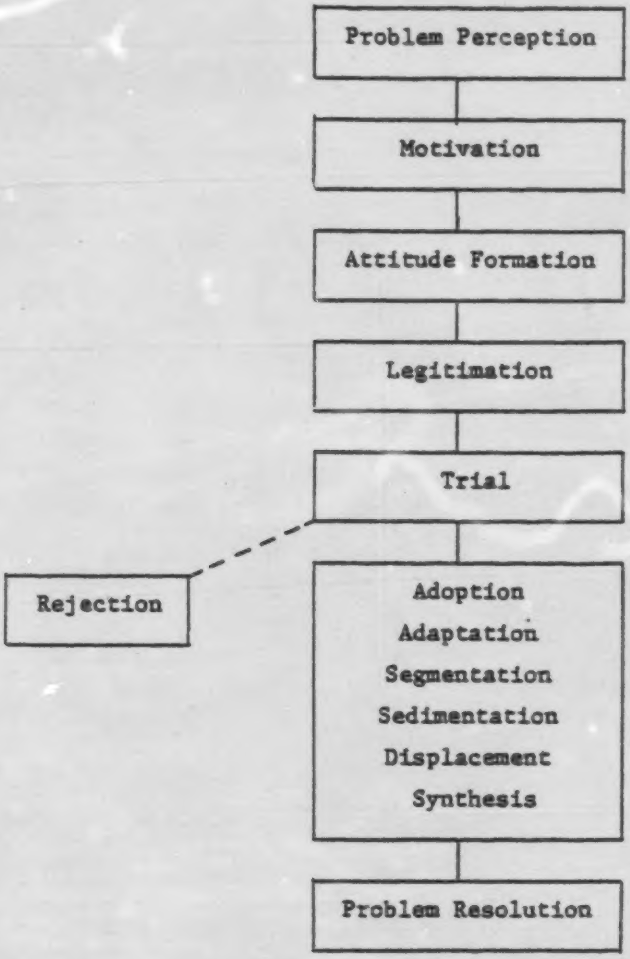
The values of variables in this simple (unweighted) aggregative index are obtained by using ten-point respondent rating scales. The problem is that respondents with identical or highly similar UQ scores may have "used" knowledge in markedly different ways. A practitioner with a UQ score of, say, 240 may have successfully adapted knowledge to the local context, while another practitioner with a UQ score of 245 may have segmented or synthesized knowledge. The Utilization Quotient (UQ) and similar measures, even where they are subjected to rigorous internal consistency reliability routines and procedures for construct validation (Nunnally, 1967) will not necessarily reflect the real but unknown meaning of "use." Indeed, this particular problem is characteristic of every published empirical study of knowledge use of which we are aware (e.g., Caplan _et_ _al_., 1975; Rich, 1979; Weiss and Bucuvalas, 1980).

A second major methodological problem is connected with the time at which "use" is measured. If we conceive of knowledge use as a process of planned social change (Zaltman, 1979) we can devise various sensitizing concepts which together point towards different "phases" of knowledge use (see Zaltman and Duncan, 1977; Rogers and Shoemaker, 1971). A framework outlining potential relationships among these sensitizing concepts is presented in Figure 1, which shows the possible routes that knowledge may travel in reaching its destination as "use."

(Place Figure 1 about here)

Figure 1

KNOWLEDGE USE AS PLANNED CHANGE


Problem Perception
Motivation
Attitude Formation
Legitimation
Trial
Rejection
Adoption
Adaptation
Segmentation
Sedimentation
Displacement
Synthesis
Problem Resolution

The sensitizing framework presented in Figure 1 depicts a linear process which, in fact, may be "short-circuited" at any point. Moreover, the validity of constructs designating component "phases" is heavily dependent of temporal properties of knowledge use. Thus, for example, if "use" is prematurely measured at the legitimation phase, then researchers will underestimate the scope and level of use. If the appropriateness of sampling strategies is determined by characteristics of the phase at which use is measured, sampling procedures should so reflect the complexity of this phase of change. For example, the problem perception phase often involves diffuse networks of providers, translators, linkers, and potential users. These diffuse networks cannot be satisfactorily represented by probability samples that take individuals as units of analysis; sociometric or snowball sampling is more appropriate. Probability samples taking individuals as units of analysis nevertheless may be wholly appropriate at the motivation phase, where networks of stakeholders who affect and are affected by the problem have already been identified. Finally, it is essential to recognize that knowledge is "used" not only at the "terminal" phase--for example, to adopt, adapt, segment, or synthesize knowledge--but also at "enabling" phases. Thus, knowledge is often used to structure or restructure a problem, processes that may eventually result in knowledge displacement or knowledge synthesis.

These and related questions about the meaning and temporal properties of "use" are closely tied to different approaches to the study of knowledge use. Contrasts among approaches involve potential choices among several different classes of units of analysis: products, persons, issues, organizational contexts, and phases (compare Weiss, 1979). Each of these classes and their subdivisions (Figure 2) imply different methodological strategies for studying knowledge use.

Figure 2

UNITS OF ANALYSIS AND IMPLIED METHODOLOGICAL STRATEGIES FOR STUDYING KNOWLEDGE USE

Unit of Analysis	Implied Methodological Strategy	
	Sampling	Data Acquisition
PRODUCTS		
— Person-Embodied	Convenience	Interviews
— Process-Embodied	Purposive	Case Studies
— Materials-Embodied	Convenience	Records
PERSONS		
— Individuals	Probability	Interviews
— Aggregates	Probability	Questionnaires
— Collectivities	Theoretical	Observation
ISSUES		
-- Well-Structured	Convenience	Records
-- Ill-Structured	Theoretical	Multiple Methods
ORGANIZATIONAL CONTEXTS		
-- Hierarchical	Convenience	Interviews
— Participative	Convenience	Multiple Methods
PHASES		
-- Perception	Sociometric	Interviews
-- Motivation	Probability	Interviews
— Attitude Formation	Probability	Questionnaires
— Legitimation	Theoretical	Observation
— Trial	Convenience	Case Study
— Evaluation	Convenience	Interviews
-- Terminal Use	Probability	Interviews
— Resolution	Convenience	Interviews

The complexity of knowledge use is thus a function of its temporal properties and the multiple meanings attached to "use" by stakeholders in educational improvement. For this reason we believe that the most appropriate strategy for research is one that combines a concern with multiple operationism (Webb et al., 1967) with that of generating constructs which are grounded in theories-in-use about knowledge held by different stakeholders (see Glaser and Strauss, 1967; Dunn and Swierczek, 1977; Zaltman, 1977).

In following a strategy of multiple triangulation (Denzin, 1970; Smith, 1977) we will attempt to identify, through available studies, reports, records of experience, consultants, and other key informants the multiple theories-in-use of educational policymakers and practitioners. This will not only permit the development of multiple constructs of "use" and their underlying dimensions, but will suggest appropriate multiple methods of acquiring data, multiple temporal frames, and multiple contexts. Specifically, this design component involves the mapping of multiple constructs of "use;" the translation of these constructs into constitutive and operational definitions of "use;" and the development, pilot-testing, and provisional validation of instruments for measuring knowledge use and school improvement.

Conceptual Elaboration. Answers to questions about the meaning of knowledge use cannot be obtained without also providing answers to a second question: Why does knowledge vary in relevance, cogency, and adequacy? This question is central to all questions of knowledge use, since it points towards the variability of standards for appraising knowledge itself. While there are many ways to explain such standards, we believe that efforts to specify social bases and structural correlates of knowledge and its use are premature. Indeed, it is a reasonably simple matter to develop hypotheses about the effects of variations in social organization on knowledge use, for example, by turning to theories of complex organizations, bureaucratic politics, social networks, and so on (see Weiss and Bucuvalas, 1980). The challenge lies, rather, in obtaining a better understanding of the "knowledge" in knowledge use.

Parallel to the development of research instruments are elaborating concepts bearing on diverse standards of knowledge adequacy, relevance, and cogency. In elaborating concepts we proceed from the position that educational improvement and other types of social reform are best viewed as arguments or debates which involve critical social transactions among different stakeholders (Dunn, 1981b). The use of argument as a unifying construct is based on prior theory and research on the logic of practical discourse (Toulmin, 1958; Toulmin, Rieke, and Janik, 1979), the functions of forensic social science (Rivlin, 1973; Brown, 1976), and the uses of argument in educational evaluations (House, 1980).

One of the strenghts of argument as a unifying construct is that it moves us away from assumptions that knowledge use is solely or primarily governed by standards of scientific adequacy and relevance. Instead, the model of argument points to the importance of studying multiple standards of appraisal in contexts of professional practice. In school settings there are multiple frames of reference--what Tyler (1978) prefers to call "cognitive maps"--which contain diverse standards for appraising outcomes of educational research and development:

> New research is likely to produce new concepts and generalizations or give different emphasis to old ones. Practitioners may hear about them or read about them, but they are not likely to incorporate them into their maps unless they meet one or both criteria--consistency with the reality they perceive, and/or providing guidance for more effective performance of their tasks. The criteria of internal consistency and parsimonious explanation, which are important to researchers, appear to have little significance to the practitioners, and this is often the reason why some research reports are given little attention by practitioners and evoke no changes in their behavior (Tyler, 1978:97).

In elaborating tests of knowledge adequacy, relevance, and cogency we proceed from a provisional framework already developed by members of the research team (Dunn, 1981b). This framework classifies disputed knowledge claims into four types of potentially relevant uses: definition, designation, evaluation, and advocacy. These four types of potentially relevant uses, based on work in forensics and semiotic (see Brockriede and Ehringer, 1960), may be cross-classified with types of standards for evaluating the adequacy of knowledge. Major types of truth tests are empirico-analytic, interpretive, pragmatic, and authenticative in character. Finally, we hypothesize that the adequacy of knowledge does not ensure its relevance; nor is the reverse true. Even where knowledge is both adequate and relevant it may lack the requisite force expected in given practical circumstances. Relations among tests of adequacy, relevance, and cogency may be visualized in terms of a factorial design, where given levels or threshholds of cogency are a function of the main and interaction effects of knowledge adequacy and relevance (Figure 3).

Figure 3

RELATIONS AMONG TESTS OF KNOWLEDGE
ADEQUACY, RELEVANCE, AND COGENCY

	Test of Relevance			
TEST OF ADEQUACY	Definitive	Designative	Evaluative	Advocative
EMPIRICO-ANALYTIC				
— Causal		.		
-- Quasi-Causal		.		
— Typological		.		
-- Representational		.		
-- Analogical		.		
INTERPRETIVE		--Cogency Test--		
— Motivational		------(level or------		
-- Quasi-Motivational		threshhold)		
PRAGMATIC		.		
— Clinical		.		
-- Comparative		.		
AUTHORITATIVE		.		
— Personal		.		
-- Ideological		.		
-- Ethical		.		
-- Methodical		.		

SOURCE: Dunn (1981b); Holzner and Fisher (1979).

In elaborating a typology of truth, relevance, and cogency tests we are making use of available theory and research on knowledge use and planned change in education and other areas. In addition we are employing consultants and other key informants, both in personal discussions, interview settings, and in workshops. This provides a vehicle for grounding the typology in the theories-in-use of educational policymakers and practitioners. Finally, the typology is an integral part of the development of instruments to measure knowledge use. As such, elements of the typology are included in research instruments.

Vignette-Focused Simulations. This third design component provides answers to the question: How can we measure the complexity of knowledge appraisals? Answers to questions about the meaning of knowledge and its uses cannot be satisfactorily provided without squarely addressing the coexistance of multiple interdependent standards of knowledge appraisal. Hence, even if we know how to conceptualize and measure knowledge and its varied uses we still require analytic procedures which bring out the underlying or latent structure of frames of reference and their constituent elements.

This design component focuses on the simulation of decisions to use knowledge. The problem here is analogous to that of decision-theoretic evaluation research, insofar as decisions to use knowledge are based on multiple attributes (Edwards, Guttentag, and Snapper, 1975). For this reason it is appropriate to construct vignettes which describe different combinations of knowledge contexts, contents, and aims. Scales and indexes can then be devised to measure variations in adequacy, relevance, and cogency attributed by stakeholders to knowledge described in vignettes. Vignette-focused simulations will be carried out in the form of personal interviews with consultants. Results of pilot-tests may be analyzed with several aims in mind:

(1) the assessed cogency of two or more knowledge claims in resolving a problem may be used as a basis for estimating the "opportunity loss" of knowledge (Savage, 1951);

(2) the cogency of a single knowledge claim may be used as a surrogate or "shadow" value of knowledge in particular contexts;

(3) the relative importance of different standards of adequacy and/or relevance may be uncovered through binary choice procedures; and

(4) weighted and unweighted aggregative "usability indexes" may be constructed on the basis of individual and group responses.

This third design component, while it poses special problems and opportunities, is being closely coordinated with the development of user-responsive instruments and the creation of a grounded typology of truth, relevance, and cogency tests.

RESEARCH PRODUCTS AND THEIR SIGNIFICANCE

The proposed study design will culminate in three major products, each of which is closely attuned to unresolved problems of knowledge use and school improvement. We hope that these products will make a substantial contribution to basic knowledge about school improvement efforts and to foundational studies of knowledge use generally.

Measuring Knowledge Use: A Handbook of Research Instruments. One of the main products of the project is a handbook of research instruments for measuring knowledge use. The first part of the handbook will provide a systematic review of conceptual issues surrounding the measurement of knowledge use. The second part will review available research instruments and those developed in the course of the project. The format of this second part will contain elements found in other handbooks of measurement, for example, Lake and Miles' Measuring Human Behavior (1974). The handbook will provide improved concepts and measures of how teachers, principals, and other educators use knowledge in their daily work; facilitate an improved understanding of the motivations of educational policymakers and practitioners as they use knowledge for school improvement; and outline new ways of identifying and measuring the many ways that knowledge resources affect and are affected by different phases of the change process-

Understanding Knowledge-In-Use: A Concept Paper. The second main research product is a concept paper, provisionally titled "Understanding Knowledge-In-Use," which outlines the typology of standards for appraising knowledge. The concept paper is likely to be divided into a short introduction, an overview of the typology, and additional sections dealing with tests of adequacy, relevance and cogency. This concept paper will provide a conceptual foundation for major portions of the handbook and identify the range of criteria employed by educational policymakers and practitioners to assess the truth, relevance, and cogency of new knowledge.

A Decision-Focused Approach to Knowledge Use: A Technical Paper. The third main product is a technical paper which elaborates a decision-focused approach to the study of knowledge use. The technical paper will systematically present steps required to analyze information and obtain summary measures and indices of knowledge use. The technical paper will provide explicit and replicable procedures for uncovering and ranking multiple criteria employed by educators to evaluate knowledge; and facilitate the measurement of potential changes in these multiple criteria. Investigators have recently outlined the contours of a similar approach in the area of performance measurement (Dunn and Mitroff, 1980).

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II KNOWLEDGE USE AND SCHOOL IMPROVEMENT: A SELECT ANNOTATED BIBLIOGRAPHY

Mary Jo Dukes

Introduction
Selection of Items
Search Procedure
Updating Procedure

ABSTRACT

This bibliography is based on a systematic search of the literature and contains 112 annotated citations of recent work in the area of knowledge utilization within the field of education. Each item is annotated according to one of five categories: (1) Provides insight into the KP&U process in education; (2) Identifies factors which impede KU in education; (3) Suggests strategies for improving KU in education; (4) Concern with theories of KU in education; and (5) Attempts to define the dependent variable "use."

INTRODUCTION

This annotated bibliography* attempts to provide a collection and summary of recent work that has been done in the area of knowledge utilization within the field of education. An attempt was made to include the major contributions to theory and research within these fields. Included among the annotations are: theoretical analyses challenging the underlying assumptions regarding the relationship between educational research and policy, empirical studies identifying factors that affect knowledge use in educational contexts; strategies to improve the usefulness of research for educational policy; and case studies which analyze the ways in which research findings were used in specific educational settings.

There were several purposes for compiling this annotated bibliography. First to identify the relevant literature and important issues in the area of knowledge use in education. Second, to determine the problems of knowledge use that are specific to the field of education. Third, to determine the nature of the relationship between educational research and educational policy making and school improvement. Fourth, to identify gaps in the knowledge use/school improvement literature.

SELECTION OF ITEMS

The items selected for inclusion in the bibliography all deal substantively with the field of education. In addition, the items generally can be grouped into one of five categories:

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* The author gratefully acknowledges the assistance of Ralph Bangs, Jan Benda, Tom McIntyre and Hassan Rahmanian in assembling this document.

1. Provides insights into the underlying process of knowledge production and utilization in education. Knowledge utilization in education is a complex process which is affected by many factors which are peculiar to education. Understanding knowledge use in education depends upon understanding the educational system and the users (teachers) within the system. Lortie (1975) provides an excellent characterization of the pattern of orientation and sentiments which is unique to teachers and distinguishes them from members of other occupations. In examining the educational system in our society, Boyd (1978) outlines the nature of the political problems which are created by the need for the institution of education to simultaneously maintain society while responding to pressures for societal change.

   Other authors examine the nature of the relationship between educational research and school improvement. Some authors contend that usefulness will always be a problem with educational research because it is a function of the different contexts and methods that characterize the research and policy functions (Levin, 1978; Pellegrin, 1965). Other authors examine and challenge the assumptions currently underlying the relationship between research and policy in education (Cohen and Garet, 1975; Coleman, 1978). Some of these authors suggest new ways of understanding, thinking about and doing research on knowledge use and educational change (Berman, 1981).

2. Factors which impede knowledge use in education. Throughout the knowledge use/school improvement literature, a diverse set of variables have been identified as potential facilitators or impediments to the use of social science research for the purposes of improving educational practice. These factors can be grouped into three broad categories:

a) Individual/Personal. This category attributes innovation adoption to variables which deal with personal factors with the individual as the unit of analysis. These variables include social psychological factors (Schmuck, 1968), the importance of face-to-face contacts and social relations (House, 1974; House, et al., 1972), and the role of the principal in facilitating innovation in schools (Chesler, Schmuck and Lippitt, 1963). One author emphasizes the importance of subjective criteria that individuals use to evaluate the usefulness of an innovation. Doyle and Ponder (1978) refer to these criteria collectively as the practicality ethic.

b) Product. This category attributes innovation adoption to variables related to the research product (Bissell, 1979). More specifically, some authors link innovation adoption to the quality of research (Levin, 1978; Pellegrin, 1965; Dickey, 1980), or the way the product is written (Levin, 1978).

c) Structural. This category attributes innovation adoption to variables uniquely related to educational organizations. Features of the public education system which are unique include goal ambiguity, weak connections between activities and outcomes, political vulnerability (Sieber, 1968; Deal, 1979; Miles, 1965; Zaltman, et al., 1977) and its incentive system (Pincus, 1974; Sieber, 1981).

3. Strategies for improving knowledge use in education. The literature reviewed for this bibliography suggest three major strategies for improving the usefulness of social science research to school improvement efforts. The first strategy involves the integration of qualitative and quantitative methods (Madey, 1981; Corbett and Firestone, 1980). It is believed that such an integration would improve evaluation design, data collection and analysis (Madey, 1981). Another strategy

prevalent in this literature is organizational development (Fullan, Miles and Taylor, 1980). Much of the literature suggests, however, that OD (as it currently exists) has failed to have a far reaching impact in educational change (Blumberg, 1976; Derr, 1976). A third strategy for facilitating educational change in schools is the use of linking agents. A general review of this literature can be found in Hood and Cates (1978). A review which includes an analysis of gaps and deficiencies in research regarding the roles and functions of external agents can be found in Louis (1981). Other authors discuss the types of linker roles (Havelock, 1968), the problems facing linking agents (Crandall, 1977) and whether linkage agents should be internal or external to the organization (Hayman, 1979).

4. Theories of knowledge utilization in education. In the field of educational change and knowledge utilization there are a number of different approaches and conceptual schema for achieving knowledge utilization in education. Several authors have reviewed and critiqued these existing models and have suggested alternative models (Fullan, 1972; Zaltman, et al., 1977; Sieber, 1968, 1974; Paul, 1977). Several authors have attempted to develop theories of knowledge use in the educational context. Dickey (1980) and Alkin and Daillak (1979) both have examined evaluation utilization and have suggested "theories" of use. In a different context, legislative decision making, Mitchell (1978; 1980) and Florio, et al. (1979) have attemtped to develop theories of knowledge use, taking into consideration the different stages involved in legislative decision making and the different information needs of the different stages.
5. Defining the dependent variable "use." Defining the dependent variable "use" is one of the most difficult yet challenging tasks currently

facing researchers in the area of knowledge use. Several authors have attempted to identify the types of uses and subuses of knowledge in educational administration (Culbertson, 1977) while some have equated use with implementation or actual use of an innovation (Fullan and Pomfret). In addition, some authors have examined the effect of research on the development of public policy. Florio (1978) discusses how research information is mixed with value choices in public policy decisions. In a slightly different context, Berne and Stiefel (1979) have identified and illustrated five perspectives for examining the impact of research on school finance policy. However, the majority of authors concerned with defining knowledge utilization in the field of education have focused on describing ways practitioners use research (White, 1979). Tyler (1978) has suggested that practitioners commonly use research to help form the conceptions that make up their cognitive maps. The most sophisticated work in this area has been conducted by Hall, et al. at the R&D Center for Teacher Education, The University of Texas at Austin. Hall et al. (1975) have identified and described eight discrete levels of use of an innovation (LOU).

SEARCH PROCEDURE

There are any number of ways a literature search similar to this could be compiled. This literature search was conducted at the University of Pittsburgh in several stages:

Stage One. Consultation with content Experts in Education and knowledge use. This was helpful in becoming familiar with key authors, books, and journals in the field.

Stage Two. Use of the Social Science Periodical Index and the Social Science Citation Index. Both of these indices allow the user to search for citations by key words and authors.

Stage Three. Use of the card catalog in order to determine what types of books (particularly books of readings) existed on this topic.

Stage Four. Current and Back Issues of Education and Education related journals. A list was compiled of these journals, and the table of context was skimmed for all current and back issues of these journals. Relevant titles as well as authors were of interest.

Stage Five. Existing Bibliographies. NIMH in conjunction with the Human Interaction Research Institute (1971, 1976) has compiled at least two annotated bibliographies of the literature regarding Knowledge Transfer and change.

Stage Six. An automated bibliographic search was conducted through the Social Sciences Information Utilization Laboratory (SSIUL) at the University of Pittsburgh. This search includes items which have appeared in the Current Index to Journals in Education (CIJE) between 1969 and present. CIJE is produced by the Education Resources Information Center (ERIC), an agency of the National Institute of Education.

UPDATING PROCEDURE

This bibliography is an ongoing project of the NIE Project Team. The reader is asked to participate in enhancing the value of the bibliography to users by making suggestions for its improvement and/or suggestions regarding additional citations to be included as the bibliography is updated.

Abbott, Max G. (1964) "The School as Social System: Indicators for Change," Socio-economic Planning Services, 2 (1969):167-174.

This paper outlines those properties or attributes of the school organization that will increase the probabilities of bringing about deliberate and planned change. As a subsystem, school organization maintains a viable relationship with the broader social system through adaptation process. In order to analyze the process by which innovations are introduced into a school and, to relate that process to organizational attributes and properties, three conceptual phases are identified: (1) awareness phase; (2) search phase; and (3) implementation phase. For each phase, the paper derives some suggestive propositions and hypotheses from the generalizations about organizational change based on current organization theories.

Alkin, Marvin C. and Richard H. Daillak (1979) "A Study of Evaluation Utilization," Educational Evaluation and Policy Analysis, Vol. 1, No. 4, 41-49.

This article is an attempt to formulate a theory of evaluation utilization. Case studies were used to see what uses were made of the evaluation; to document the extent of the evaluation and to trace the evaluation process in detail; to identify any strategies employed by the evaluator; and to examine the forces which shaped the eventual outcome of the situation. The findings of the study indicate that modifications in the programs as a direct result of the evaluations were rare; what was more common was gradual, incremental impact. The case studies show that evaluation utilization does often occur, though seldom in major ways. The authors suggest a framework which focuses on those facets most critical to utilization. The framework consists of eight categories which affect utilization: 1) Preexisting evaluation bonds; 2) Orientation of the Users; 3) Evaluator's approach; 4) Evaluator credibility; 5) Organizational Factors; 6) Extraorganizational Factors; 7) Information Content and Reporting; 8) Administrator Style. The authors consider this to be an important first step in understanding evaluation utilization.

Allan, G.S. and W.C. Wolf (1978) "Relationships Between Perceived Attributes of Innovations and Their Subsequent Adaption," Peabody Journal of Education, 55, 4:332-336.

This study examines relationships between educators' innovation adoption behavior and five attributes of innovation described by Rogers and Shoemaker, i.e., relative advantage, complexity, comparability, trialability, and observability. These attributes are treated as independent variables and adoption of innovations is considered as dependent variable. The results of these analyses only support the hypothesized relationship concerning complexity of innovation and its adoption. The other four hypotheses are rejected in the context of this study.

Armstrong, D.G. (1980) "Researchers' Incentives and the Dearth of Practical Research Results," Peabody Journal of Education, October:55-60.

This article advocates the challenge of providing researchers with real incentives to produce quality research with direct applications to the classroom. Unless teachers generate a real demand for products of research as opposed to a cosmetic demand, researchers will continue to respond to incentives coming from administrators, from a process-oriented national research community, and from tenure and promotion panels. These existing incentives stimulate the production of studies large in number, limited in scope, and deficient in quality. Educational researchers interested in providing research issues of genuine import to classroom teachers face an imperative of directly acting to modify the system of incentives undergirding present research practices.
(author summary, modified)

Baldridge, J.V. (1975) "Organizational Innovation: Individual, Structural and Environmental Impacts," in Managing Change in Educational Organizations, (eds.) J.V. Baldridge and T.E. Deal. Berkeley: McCutchan Publishing Corporation.

This article argues that traditional research on innovation and organizational change has focused on the wrong sets of variables. More specifically, an orientation toward the early phases of the innovation cycle, preoccupation with small-scale technical innovations, and individualistic biases have hindered our understanding of major organizational innovation. The author suggests that a more productive analysis of the change process should focus on complex technologies with ambiguous evaluations, shift emphasis from individualistic variables to roles and organizational structure and investigate environmental factors more closely. The second half of the article presents an overview of results from two research projects on organizational change. The results in both studies support the hypothesis that a large, complex organization with a changing heterogeneous environment is likely to be more innovative than a small simple organization with a relatively stable, homogeneous environment primarily due to the "demand structure" which is related to size of the organization. The findings also indicate that differentiation and structural complexity are critical for innovation.

Ben-Peretz, M. and Pinchas Tamir (1981) "What Teachers Want to Know About Curriculum Materials," Journal of Curriculum Studies, 13, 1:45-54.

The purpose of the research reported in this article was to investigate the following questions about the views and concerns of Israeli secondary teachers in relation to centrally produced curriculum materials:

1) What questions about curriculum materials concern teachers most?
2) What is the relationship between the importance teachers attach to these questions and their preferences regarding actual curriculum characteristics?
3) What image do teachers have of their own role in curriculum implementation?

The author's findings are discussed in terms related to teacher attitudes regarding their professional roles and competencies.

Berman, P. (1981) "Educational Change: An Implementation Paradigm," in Improving Schools: Using What We Know, (ed.) R. Lehming and M. Kane. Beverly Hills: Sage Publications.

This paper contends that the accumulation of empirical studies point toward new ways of understanding, thinking about, and doing research on knowledge utilization and educational change. The focus of the paper is on the idea that the very inconsistency of research findings over the last decade may reflect educational reality, not simply inadequate methodology. This paper reviews research on educational change in the 1950's and 60's in order to identify the predominant research paradigm of the period. This paradigm is called the Technological-Experimental paradigm. Furthermore, the paper describes the nature of the paradigm shift by proposing three meta-propositions that encapsulate a new emergent paradigm. The three propositions in new paradigm are: (1) implementation-dominant proposition; (2) loosely coupled process; and (3) the conditional nature of explanation and prediction. This new paradigm offers no guarantee of the eventual emergence of a unified theory of educational change. Instead it accepts lowered expectations for research findings. This paper concludes with some reflections on future research.

Berman, P., McLaughlin, M.W., et.al (1975 and 1977) Federal Programs Supporting Educational Change (8 volumes). Santa Monica, CA: Rand Corporation, 1975 (volumes 1-5); 1977 (volumes 6-8).

This series of five reports describes the results of the first year of the Rand Change Agent Study (July 1973-July 1974). Volume I (A Model of Educational Change) provides a theoretical perspective for the Rand study by analyzing the current state of knowledge of planned change in education and by proposing a conceptual model of factors affecting change processes within school districts. Volume II (Factors Affecting Change Agent Projects) contains the analysis of survey data collected from a national sample of 293 projects in 18 states. Volume III (The Process of Change) summarizes the results of 29 case studies of change agent projects conducted in 25 school districts. Volume IV (The Findings in Review) summarizes the findings of the previous volumes and also synthesizes extensive data collected on federal level program strategy and management for each of the change agent programs. This volume also discusses alternative strategies for promoting innovation. Volume V (Executive Summary) presents the study's methods and results. Volume VI (Implementing and Sustaining Title VII Bilingual Projects) discusses the complex process of establishing bilingual programs in local school districts, with particular attention given to those aspects of the Title VII program and to those political influences that affect local implementation. Volume VII (Factors Affecting Implementation and Continuation) presents an analysis of the survey data collected in 100 Title III projects in 20 states. This volume deals specifically with the questions of implementing and sustaining part or all of special project strategies after support ends. Volume VIII (Implementing and Sustaining Innovations) summarizes the findings from both phases of the study and drawing on these, describes the process of change at the local level. This volume also contains a discussion of policy implications that are derived from this study.

Berne, Robert and L. Stiefel (1979) "Social Science Research and School Finance Policy: Documentable Impact or Wishful Thinking," American Behavioral Scientist, November, 23, 207-36.

The purpose of this article is to provide a basis for furthering our understanding of the impact of research on policy. The authors address the question of whether research impacts policy by formulating alternative ways to view this impact. This discusses five perspectives: 1) the problem-solving model; 2) the basic-applied model; 3) research as value clarification; 4) research in the service of advocacy; and 5) researcher as educator. The authors elaborate on these perspectives and give illustrations of all five perspectives from the area of school financial policy. The final section assesses how these five perspectives can bring us closer to using social science research to answer the question of the impact of research on policy.

Bissell, Joan S. (1979) "Use of Educational Evaluation and Policy Studies by the California Legislature," Educational Evaluation and Policy Analysis, Vol 1, No. 3, p. 29-37, May-June.

The author discusses the characteristics of evaluative studies used by California State legislators. A number of principles are identified concerning particular factors which tend to enhance the utility of evaluations to policy makers. These include: 1) policy oriented evaluations should address the specific issues of concern to the decision makers; 2) evaluations should include attention to fundamental fiscal and legal questions in addition to program effectiveness questions; 3) measures used in evaluations should be straight forward and understandable to a wide audience; 4) evaluations should aid decision makers in developing a general understanding of educational practice; 5) evaluations should be responsive to the variety of values and program objectives found among local officials. It is particularly important that a broad range of outcome indicators be included in order to ensure attention to the diverse values held for educational programs.

Blumberg, A. (1976) "OD's Future in Schools - Or is There One?" Education and Urban Society, Vol. 8, pp. 213-227.

The author suggests that OD in the schools today is a fragmented and isolated affair; at this time the OD function remains nonaccepted and noninstitutionalized. This situation exists* because of: (1) the concept of schools as organizations held by school administrators; (2) the nature and tradition of staff development services in school system organizations; (3) the paucity of data on the results of OD programs in schools; and (4) the manner in which current economic conditions affect the setting of priorities and decision-making in the schools.

* and is unlikely to change

Boardman, Anthony E. and David Horowitz (1978) "The Potential of Social Science Research for Educational Management and Policy: Theory and Practice," Urban Education, Vol 12, No. 4, pp. 363-88.

This article presents some explanations for why social science research has been of limited value to the educational policy maker and makes some recommendations to both the policy analyst and the policy decision maker.

Bowles, B. Dean (1975) "Comments on the Iannacoone Paper," Education and Urban Society, Vol 7, No. 3, pp. 239-45.

Discusses four issues: The difference between policy research and basic research; the importance of policy research for basic research; the generalizability of field studies; and the relationship of both of the professor in the professional school to the client in the field and of the professional school to the overall society.

Boyd, W.L. (1978) "The Changing Politics of Curriculum Policymaking for American Schools," Review of Educational Research, 48, 4:577-628.

To what extent should the public schools be agents to preserve our culture - and to what extent agents to change it? To answer this question, it is desirable to have a better understanding of the complex nature of current curriculum policy making, how this situation developed, and of the trends and implications of the changing politics surrounding this arena. The purpose of this paper is to make a reconnaissance of this large, but minimally explored subject. Because of the scope of the topic, this paper emphasizes primarily the political problems created for curriculum policy makers by the simultaneous need for the school curriculum to maintain society while responding to pressures for societal change. Curriculum policy making usually proceeds quietly and incrementally rather than being characterized by the model of rational decision making. As a consequence of the crises, a new shift is nonincremental or innovative curriculum policy making. Such more dynamic decision strategies are associated with what has been called "professionalization of reform." The nature of decision making also is affected by the nature of the structure of authority over curricular policy making. Finally, the paper discusses the constraints upon policy innovations that inhibit change.

Bush, Robert N. (1976) Educational Research and Public Policy: Problems and Promise. Occasional Paper No. 12. Stanford Center for Research and Development in Teaching, Stanford University, CA. Presented at the Annual Meeting of the American Educational Research Association (San Francisco, CA, April 20) 10 p.

The art of relating educational research to public policy is still primitive. Educational policy is formed mainly by tradition and the political pressure of interest groups, while educational researchers study questions determined by the scientific community. Educational research has not noticeably influenced policy because trained researchers have been too few, resources too limited, and efforts too fragmented. The need for illuminating educational policy by research is great, and the situation is becoming serious. The California Beginning Teacher Evaluation Study, which illustrates cooperation between educational policy makers and researchers includes these aspects: (1) The study is a genuine cooperative venture between the policy makers and researchers; (2) It has had sufficient funding from the several million dollars available to develop new programs; (3) The research and its eventual application requires time, which is available; (4) The study has been flexible in its planning and implementation stages; (5) The policy makers and the researchers meet together continuously, and each teaches the other; (6) The project has had continued advice, to which it has listened, from a broad spectrum of persons on a research advisory board; (7) The research and policy effort has been continuous; and (8) The project is taking advantage of spinoffs. If this study is a good example of research relevant to public policy, then educators are moving from a primitive state of organizing research and policy.

Charters, W.W., Jr. and R.J. Pellegrin (1973) "Barriers to the Innovation Process: Four Case Studies of Differentiated Staffing," Educational Administration Quarterly, 9, 1:3-14.

Researchers at the Center for the Advanced Study of Educational Administration spent the 1970-71 school year conducting on-site observational studies in their first year of implementing Differentiated Staffing. The primary purpose of this study was to develop a better understanding of the process of organizational change in schools and of the problems that commonly accompany such change. Based on their observations the authors have identified several major themes which affect the implementation of major educational change.

1. The fundamental but generally unacknowledged strain that exists between the ideology of teacher governance and the strategy of directed change.
2. The gross unclarity in conceptualization and definition of what the schools are attempting to implement through change projects.
3. The heavy reliance on structural change (writing job descriptions, changing titles, altering organizational units) in the belief that appropriate behavior changes will automatically follow.
4. The fallacious assumption that a statement of general, abstract program values and objectives will easily be translated into new and appropriate behavior patterns at work.
5. The unrealistic time perspective of those responsible for educational innovation, according to which basic and far-reaching changes in instructional roles and staff relationships are seen as accomplishable within a year or two.
6. The ambiguities and stresses that arise in the disjunction between the school district's established administrative structure and the temporary system for project management.
7. The failure to recognize that teachers have scant training and experience in forming and implementing processes and procedures for collaborative decision making.
8. The conflict in goals, values, and interests, seen especially in the relationships between the central office administrators, the project managers, and the school staffs (produced mainly by the requirements of their inherently different work contexts).
9. The absence of managerial and monitoring procedures to assure implementation and to alter plans in the face of contingencies that inevitably occur.
10. The failure to recognize the severity of role overload among members of the instructional staff when innovation is attempted.
11. The tyranny of the time schedule in constraining change.
12. The apparent assumption that schools need little additional resources (financial and personnel) to cope with the massive organizational disruptions during the period of transition from one educational program form to a new one. (p. 12)

Chesler, M. A., Schmuck, R. and R. Lippitt (1963) "The Principal's Role in Facilitating Innovation," Theory into Practice. December, 2, pp. 269-277.

This article is a report on a pilot study that was designed to determine the influence of the principal's behavior on the development and sharing of innovative classroom practices. Improvements in teaching occur when teachers can share ideas and experiences, and staff interpersonal relations influence this sharing. The role of the principal in this process is both direct (encouraging an atmosphere supportive of experimentation and sharing) and indirect (his style of leadership may make teachers feel comfortable in discussing new ideas). The authors found that the factors most relevant to teachers' initiating creative efforts were: 1) new practices could help solve problems important to them and their students; 2) a given practice is adaptable to their own teaching style, and therefore does not require a great expenditure of time and energy; and 3) the school administration will support the new practice.

Cohen, David K. and Michael S. Garet (1975) "Reforming Educational Policy with Applied Research," Harvard Educational Review, Vol 45, No. 1, Feb., 17-43.

There are several misleading assumptions that are held with regard to the relationship between research and policy. One assumption is that policies consist of discrete decisions: social research is expected to affect policy by influencing discrete choices among competing programs and methods. A second assumption is that applied research is more authoritative than ordinary common sense ideas about policy: it is assumed that advances in methodology will bring about corresponding advances in the authority and relevance of the information available for policy making decisions. The authors investigate these assumptions through the use of case study materials from educational policy research. The evidence suggests that research affects policy, but generally it does so in "odd and unexpected" ways. The authors attribute the unexpected consequences of research to the faulty assumptions underlying the application of social research to policy. They offer alternative assumptions and an alternative conception of policy research which argues that "applied research is not a disinterested effort to improve policy, but rather a broad-aim social innovation designed to change the basis for decision-making."

Coleman, James S. (1978) "The Use of Social Science Research in the Development of Public Policy," Urban Review, Vol 10, No. 3, pp. 197-202.

Although social policy makers and researchers assume that research is a major part of the information base upon which policy decisions are made, social policy is by nature incompatible with the organizational structure and time requirements for decision making in an administrative system. Whereas social policy decisions are timed in accordance with legislative sessions, social research tends to be a lengthy process and often does not provide results in time to be of use for policy making. There are, however, other less direct ways in which social research affects policy. One way in which policy can be used is to legitimate a challenge to existing policy. An example of this type of use is the widespread citation of the 1966 U.S. Office of Education Report "Equality of Educational Opportunity" by civil rights groups, plaintiffs in court cases, and in school board deliberations. Another way in which research is useful to policy is in answering procedural questions about how to increase the effectiveness of policies in force. In general, research on procedural questions will be more effective when it is done in-house, communicated directly and privately to those in authority, and performed on a continuous monitoring basis. Research on policy issues, on the other hand, should be done by an outside group which focuses on one particular issue and disseminates research results to all interested parties. The conclusion is that social research is less frequently used by an administrative body with authority to legitimate a policy than by external groups, without authority, to challenge existing policy.

Coleman, James S. (1976) "Policy Decisions, Social Science Information, and Education," Sociology of Education, Vol 49, No. 4, pp. 304-12.

Examines the nature and accomplishments of social policy research and provides general suggestions for improving information flow to particular areas. The author maintains that the majority of policy research has been carried out in education and has been less successful than it might be due to insufficient feedback systems.

Coleman, Peter (1979) "Teaching, A Profession for Amateurs? Building Research/Practice Linkages Via Informal Field-Based Training Activities for Teachers." Presented at the Canadian Educational Research Association Conference (Winnipeg, Manitoba, Canada, Sept. 24-25) 21 p.

Ways of implementing educational innovations produced by research into practice in the schools are considered. It is stated that the most effective tool for accomplishing this is inservice teacher education. The characteristics of an exemplary inservice teacher education program are outlined and discussed. The suggestion is made that teacher centers are potentially the most important link between university-produced research and changed practices in the schools, and that a consortium of university-teacher center-public school would be desirable.

Corbett, H. Dickson, III and William Firestone (1980) Constructing Case Studies on Educational Change for Policy Makers. Presented at the Ethnography in Education Research Forum (University of Pennsylvania, Philadelphia, PA, March), 30 p.

The popularity of using qualitative, or ethnographic, research methods to improve educational practices is increasing. However, an examination of how research findings are translated into policy is necessary to assess accurately the extent to which this goal can be realized. This paper assesses the efficiency of four strategies for increasing research use in policy making: enlightenment-transfer, engineering-transfer, enlightenment-transaction, and engineering-transaction. "Enlightenment" and "Engineering" are labels used to describe basic and applied research design. "Transfer" and "Transaction" describe methods of disseminating research information. It can be concluded that qualitative researchers interested in having research incorporated into policy would be best advised to use either of the two transfer strategies and concentrate on improving the kind and form of information they present. Guidelines for researchers for facilitating the incorporation of research into policy are presented. An example of an attempt to direct research to policy makers, illustrating additional difficulties faced by qualitative researchers, is provided.

Corwin, R.G. (1972) "Strategies for Organizational Innovation: An Empirical Comparison," American Sociological Review, 37:441-454.

This article outlines aspects of social intervention strategies which the sociological literature suggests will be conducive to change. Citing classical works in organizational sociology the author hypothesizes that certain characteristics of both individuals and organizations will be associated with change. In order to test his hypotheses the author studied ten Teacher Corps Programs. The Teacher Corps Program was a national experiment to train teachers and improve the quality of education in low income schools. The dependent variable is the number of new technologies introduced into the school through the program. Thirty-five indicators were factor analyzed, indicating seven factors associated with change. Regression analysis, however indicates that only half of the variance in the dependent variable is explained. Although the author notes that the generalizability of the findings is questionable, he tentatively concludes the following:

(1) The way an innovation is conceived and implemented is a product of a combination of forces inside and outside the organization.
(2) Characteristics of both occupation and organization must be taken into account in order to explain innovation.
(3) A split develops between the established leaders of a profession and a new generation.

Crandall, David P. (1977) "Training and Supporting Linding Agents," In Nash, N. and J. Culbertson (eds.) Linking Processes in Educational Improvement: Concepts and Applications. Columbus, Ohio: University Council for Educational Administration.

The purpose of this chapter is to present a view of the realities facing those playing linking roles and to give direction to renewed efforts to develop training and support mechanisms for linking agents. The first section of the chapter presents the assumptions underlying the paper. The second consists of four principal subsections. The first presents three major perspectives on the current practice of linking agentry; the second addresses the nature of the resource system and the common sources and attributes of the innovations that are typically the nucleus of program improvement efforts; the third discusses the client system as a complex social system and as an organization subject to a multitude of influences; and the fourth subsection deals with the host agency responsible for supporting the many needs of the linking agents they house. The third section of the chapter deals in depth with the linking agent proper. The many dimensions of this multifaceted creature are articulated and illustrated, the multiple roles to be played are described, attributes and skill clusters associated with the multiple roles are presented, and the question of selection versus education versus training is touched on.

Culbertson, Jack (1977) "Linking Agents and the Sources and Uses of Knowledge." In Nash, N. and J. Culbertson (eds.) Linking Processes in Educational Improvement: Concepts and Applications. Columbus, Ohio: University Council for Educational Administration.

Some of the major underlying assumptions of this paper are that there are differingtypes of knowledge users; that they make differing uses of knowledge; that if the linkage agent concept is to be understood and defined within education as a macro-system, the uses of knowledge and the conditions affecting knowledge utilization need clarification. Toward this end, five major uses and ten sub-uses of knowledge have been set forth, as have been some of the conditions affecting knowledge use. The major and their sub-uses are to create new knowledge-conclusion research and policy research; to develop new syntheses-concept-oriented syntheses and practice-related synthesis; to attain new developments-product development and idea development; to achieve new or improved practice-improved policies and programs, and newly instituted policies or programs; and to improve training programs-in-service programs and pre-service programs. This chapter is written largely from the perspective of educational administration.

Davis, Junius (1976) "Potentials of the NLS Data Base for Issue-Oriented Analyses and For Influencing Educational Policy Decisions." Presented at the Annual Meeting of the American Psychological Association. (84th, Washington, D.C., Sept. 3-7), 10 p.

The potential of research which uses the data base from the National Longitudinal Study of the high school class of 1972 (NLS) for affecting federal policy is discussed. Currently, social science research is rarely used as a basis for policy decisions. A reason for this is that social scientists profess interest in policy issues, yet are naive in understanding how policy decisions are formulated and in knowing how to report research so that it is politically relevant. A report prepared by the Rand Corporation sees the NLS data as having potential for four stages of policy formulation: (1) Early warning of forthcoming problems, (2) Issue exploration, (3) Identification of specific problems, and (4) Evaluation of the impacts of past policy decisions. The author suggests only two stages: The exposition or confirmation of a problem or need that was previously suspected, and the evaluation of prior policy decisions or solutions that have begun to fall into disrepute. Political sophistication and an advocate/adversary stance may be the research tools of the future for social scientists.

Deal, Terrence (1979) Linkage and Information Use in Education Organizations. Presented at the Annual Meeting of the American Educational Research Association (San Francisco, CA, April) 14 p.

Linking activities between knowledge production and actual practices in schools need to be guided by understanding of how educational organizations work. Educational organizations evidence unique organizational patterns, including diffuse goals, weak connections between activities and outcomes, political vulnerability, and working conditions that emphasize individual autonomy. As new knowledge is linked to schools and used by administrators and teachers, these organizational patterns create important opportunities and pitfalls. In schools, knowledge use and transformation may serve purposes other than the intended objective of change or reform. Knowledge utilization also provides legitimacy to existing programs, new enthusiasm, new beliefs, and an improved public image for the schools. New knowledge may also undermine existing relationships within schools or between schools and the outside environment. For instance, when knowledge is used to redefine roles or relationships, change practices, or alter characteristics of schools, conflicts arise. Without an adequate understanding of organizational realities in schools, efforts to increase the role of knowledge in change and reform will produce more problems than solutions.

Derr, C.B. (1976) "'OD' Won't Work in Schools," Education and Urban Society, 8, 2: 227-241.

The author claims that OD has failed to have far-reaching impact because, like other curricula, it was packaged for teachers and administrators such that it became a program and a fad rather than a continuous process. In addition, various dimensions of the traditional school organization do not lend themselves to the current form of OD. The dimensions are: (1) the lack of common indicators of performance; (2) the nature of the school environment; (3) the high autonomy needs of people who work in schools; (4) the low degrees of required interdependence; (5) the civil servant mentality; and (6) the shortage of economic resources.

Dickey, Barbara (1980) "Utilization of Evaluations of Small Scale Innovative Educational Projects," Educational Evaluation and Policy Analysis, Vol 2, No. 6.

This study focuses on the evaluations of Title IV-C projects in the state of Minnesota funded in FY 1975 and FY 1976. The purpose of the study was to examine educational evaluation utilization by addressing the following questions: (1) What is the reported level of utilization of the evaluations examined?; (2) What factors are related to the reported level of utilization?; (3) How is the level of utilization related to the role of evaluation in the process of planned change? In addition, the author reviews the literature on "underutilization" and categorizes the arguments into three broad categories: (1) Inherent organizational inertia causes resistance to any change; (2) The quality of evaluation needs improvement: the state of the art is in its infancy and better methods and techniques must be developed; (3) the "two communities" notion: differences in experience and outlook between decisionmakers and evaluators make communication difficult. It is from these broad categories that the author derives the independent variables for the study. The findings suggest that these evaluations have had an impact, not only at the project level, but also in helping to validate exemplary projects for wider dissemination. Based on this study, the author recommends that evaluators should adopt a more collaborative role, involving the decision maker and the staff in decisions about the evaluation.

Doyle, Walter and George Ponder (1978) "The Practicality Ethic in Teacher Decision-Making," Interchange, 8, 3:1-12.

This article focuses on the decision making processes which appear to underlie teacher reaction to change proposals. The authors assert that the practicality ethic is a key link in the knowledge utilization chain in schools. The practicality ethic refers to the evaluative process which takes place when a teacher makes the initial decision regarding the implementation of a proposed change in classroom procedure. Proposed changes which are seen as practical will be incorporated, at least tentatively into teacher plans. This paper, then, is a study of the perceived attributes of innovations and the way in which these perceptions determine the extent to which teachers will evaluate and attempt to incorporate proposed changes. The authors contend that decisions about practicality result from the complex interaction of several variables. They further assert that teachers appear to use three general criteria to determine if an innovation qualifies as "practical." These criteria are instrumentality, congruence and cost. Instrumentality means that an innovation or change proposal must describe a procedure which depicts classroom contingencies. Congruence refers to the extent to which a proposed innovation is consistent with teachers' perceptions of their own situations. Cost, in this context, refers to the ease with which the proposed innovation can be implemented and the potential rewards for adopting an innovation.

Everhart, Robert B. (1976) "Ethnography and Educational Policy: Love and Marriage or Strange Bedfellows?" Anthropology and Education Quarterly, Vol 7, No. 3, pp. 17-25.

Reviews some major characteristics of ethnography as they apply to policy issues and policy formulation, and ethnography's utility from the perspective of how public educational policy is made. Discusses the potential contributions of ethnography and the responsibilities ethnographers must consider if their work is to have an impact on public policy.

Florio, David H. (1978) "Research and the Politics of Education," Educational Forum, 42, 4, 490-501.

We are in the midst of a turning point in federal education policy. The research community has a major contribution to play in the shifting pattern of federal education support. The author suggests that several assumptions must be understood about the use of research in policy making: (1) First, it should be understood that social science evidence will be used by policy makers for a variety of purposes (e.g., confirming past policy decisions, challenging positions of others, making a case for or against popular ideas, etc.); (2) It should be clearly recognized that politics is the business of allocating values and scarce resources. Social science evidence, therefore, is mixed with value choices in the development of public policy; (3) Research often provides additional, therefore more complex, perspectives on social problems and, in so doing, challenges simplistic or inadequate solutions; (4) policy makers should understand the diversity of inquiry that fits under the rubric of research. Policy makers, participants in the R & D community, and users of R & D results must take an increasingly sophisticated view of the research enterprise. The benefits and limitations associated with immediate, short term, and long term investments must be articulated. If these opportunities are missed, federal support for research will surely decline or, worse, will be limited to immediate and short term inquiries.

Florio, David, Michael M. Behrmann and Diane L. Goltz (1979) "What do Policy makers Think of Educational Research and Evaluation? Or do they?" Educational Evaluation and Policy Analyses VI, N. 6, 61-87.

Twenty-six congressional staff members dealing with educational legislation were surveyed concerning their sources of information and the relative importance and value of educational inquiry in various stages of the policy process. The findings of the study reveal much about the disparities between the educational inquiry community and the political arena of legislative decision making. The conclusions of the study are: 1) There is a relatively small group of staff in the Congress with principal responsibility for educational policy decisions; 2) Congress must gain a greater understanding of the distinctions among types of research, particularly between policy research and evaluations as opposed to social research or data collection; 3) There continues to be a strong belief among congressional staff that complex human and social problems can be transferred by "hard data" into technical, organizational or programmatic solutions; 4) If researchers wish to have an immediate impact on legislative decisions, they must address a fairly narrow range of choices; 5) Addressing policy maker's questions does, however, enhance a researcher's credibility and opportunity to introduce additional questions or challenge popular assumptions; 6) The initial burden for improving the use of knowledge will fall more heavily with the researchers; 7) There is currently enough valued use of educational research to retain the perception that such inquiry can play an important role in the improvement of educational policy.

Fox, R.S. (1972) "Innovation in Curriculum: An Overview," Interchange, 3, 2-3.

The author views innovation in curriculum as gaining its thrust from a new set of value priorities - humanism, concern for racial and socioeconomic minorities, support of pluralism and diversity, increased interest in affective development, education for the very young, and legitimization of the search for value. These priorities are coupled with new understandings of how learning takes place, which cast the learner in an active, responsible, self-actualizing role and, at the same time, support the development of precise, highly organized sets of learning materials designed to achieve clearly defined objectives as efficiently as possible. A literature review covering each of the aforementioned concepts is provided, and implications of these concepts are examined in relation to curriculum design, instructional materials, professional roles, and the need for in-service education.
(author abstract-modified)

Fullan, M., Miles, M., and G. Taylor (1980) "OD in Schools - The State of the Art, Volume II, Review of Research in OD," Review of Educational Research, 50, Spring, pp. 121-183.

Organization Development (OD) is a change strategy for organizational self development and renewal. Adapted from business settings, it has been used in schools over the past 15 years. There are widely different images of what OD is, and widely different claims made for its value or worthlessness. The field of OD in education is badly in need of stock taking. In this review the authors assess the state of the art of OD in four respects: (1) critiquing and clarifying the values, goals, and assumptions of OD in general and as applied to education; (2) identifying and analyzing the various models and operating characteristics of OD in practice (conditions and strategies affecting its initiation, implementation, and continuation); (3) assessing the impact or outcomes of OD on achievement, productivity, and attitudes; and (4) reconsidering OD's future, and suggesting policy implications for educational agencies at different levels.

Fullan, M. and A. Pomfret (1977) "Review of Research on Curriculum and Instruction Implementation," Review of Educational Research, 47, Spring, pp. 335-397.

The authors define implementation, which is claimed to be separate from planning and adoption processes, as "the actual use of an innovation or what an innovation consists of in practice." It is suggested that there are at least five dimensions of implementation in practice — changes in materials, structure, role/behavior, knowledge and understanding, and value internalization. Approximately 20 previous research studies were examined by the authors in relation to how to measure implementation and to the determinants of implementation. Several factors which have a significant impact on the implementation of innovations are identified for each of four broad categories: (1) characteristics of the innovation; (2) strategies; (3) characteristics of the adopting unit; and (4) characteristics of macro-sociopolitical units.

Fullan, M. (1972) "Overview of the Innovative Process and the User," Interchange, Vol. 3, 2-3.

The focus of this overview is on the role of the user (student, teacher, parent) in the educational change process. The first section reviews literature by critically examining the assumptions of existing models and approaches to educational change, and by analyzing evidence on actual user experience with educational innovations. The main conclusion is that the model process of change whereby innovations are developed external to schools and then transmitted to them has led to no significant change at the user level.

In the second section the analysis is extended by relating the basic contentions and findings of the authors in this Interchange volume to the criteria for effective change identified in the first section.

The overall conclusion in the final section of this overview is that a radical restructuring of the role of the user and a complete reversal of the direction of influence in the process of change are required if effective innovations are to occur. Finally, the main prinicples and elements of reform - techniques, activities, organizational forms - necessary to support this active user role, and other factors beyond the user level that might impinge on this role, are outlined.

(author abstract, modified)

Fuller, F.F. (1969) "Concerns of Teachers: A Developmental Conceptualization," American Educational Research Journal, 6, 2:207-226.

From the author's own studies and from the data of other investigators, three phases of concerns among student teachers and teachers were identified. In the pre-teaching phase, students in education courses tended to have no major concerns about teaching. In the early-teaching phase, student teachers were most concerned about class control and their own adequacy in the classroom. In the late-teaching phase, experienced teachers tend to focus on pupil gain and self evaluation.

Giacquinta, J.B. (1975) "Status Risk-Taking: A Central Issue in the Initiation and Implementation of Public School Innovations," Journal of Research and Development in Education, 9, 1.

This article examines conceptual and empirical work bearing on risk-taking and on public schools as complex organizations, in an attempt to better understand why planned change in schools has been, and continues to be, difficult to effect.

The paper focuses on schools as complex organizations consisting of a set of formally defined positions or statuses. Associated with each status is a set of expectations for behavior, or roles. An educational innovation means the modification of patterns of role interaction - leading to status risk-taking.

The author reviews literature on risk-taking, and discusses the relationship between the uncertainty which results from status risk-taking situations and the resistance to organizational innovation.

The author concludes by suggesting that participation may act to extinguish uncertainty or to suppress risk-estimation, and thus facilitate effective change.

Giacquinta, J.B. (1973) "The Process of Organizational Change in Schools," in Review of Research in Education, (ed.) F.B. Kerlinger. Itasca, ILL: FE Peacock.

This review of literature is basically atheoretical in nature and provides the basis for two tentative propositions about organizational change. The first is that the extent of change in any school's organization and speed with which it occurs depend upon multiple factors: the nature of the innovation introduced, the tactics used to introduce it, the characteristics of the individual school members who must carry it out, and the properties of the school structure in which it is introduced. The second proposition is that an attempt to change a school organizationally, when successful, proceeds in three basic stages: initiation of the innovation, implementation, and incorporation as a stable part of the organizational structure. The factors of change set forth above and the three basic stages in the process are discussed throughout the paper. Finally, a theoretical framework for the future study of change emerging from this analysis is proposed, and procedures for collecting and analyzing data that will be required for future exploration of change in schools, as well as in other complex organizations, are suggested.

Gideonse, Hendrik D. (1978) "A Model for Educational Research and Development: 1985," Occasional Paper No. 44. Presented at the National Center for Research in Vocational Education Staff Development Seminar (Columbus, OH, June), 26 p.

Three broad statements summarizing nine axioms underlie a conceptualization of the character of behavioral and social research: (1) Social and behavioral science is inherently reflexive, (2) Ethics and epistemology are inseparable, and (3) The inherent complexity of behavioral and social phenomena must be reflected in the models developed to guide the support of productive educational research and development (R&D). The idea of differing epistemologies suggests that ignorance of or failure to recognize the worth of others' work leads to conflict between practitioners and researchers, research administrators and politicians as well as to slow adoption of research. A promising interaction model for educational research focuses on the outcomes of research and those who have a stake in the outcomes. Relationships between "stakeholders" and outcomes vary. The form of an outcome is related to accessibility to stakeholders; stakeholders may have several relations in respect to a research outcome-primary, secondary, or tertiary. Policy implications flowing from the model lie in three main areas: the legitimization of a broader array of R&D activities, functions, and actors; decentralization of authority and responsibility for educational R&D; and the demand for much more careful analysis and attention to policy in its own right.

Granville, Arthur C., et.al. (1978) The Impact of Evaluation: Lessons Drawn from the Evaluations of Five Early Childhood Education Programs. Presented at the Annual Meeting of the American Educational Research Association (62nd, Toronto, Ontario, Canada, March 27-31), 45 p.

Five different program evaluations were described to indicate those qualities which make an evaluation effective or not effective. Evaluation effectiveness was defined as impact on decision making or long-term policy formation, and influence upon a variety of audiences. Robert D. Matz described the first chance project, and concluded that the evaluation methodology used to inform policymakers should be distinct from the approach used to improve teaching. John M. Love, who was associated with the National Home Start Demonstration Program, felt that several factors contributed to the value and use of evaluation information: Evaluations planned with the program; timely reports; rigorous experimental design; respect between agency and evaluators; demonstrated relationships between process and outcomes; and non-controversial appeal of the program. Project development continuity was discussed by Arthur C. Granville. Factors affecting evaluation impact included the relevance of quantitative data; sociopolitical acceptability of the implications; and pertinence to evaluation criteria. Allen G. Smith, who discussed project follow through, supported close relationships between evaluation research and curriculum. Lawrence J. Schweinhart of the Ypsilanti (Michigan) Perry Preschool Project recommended intensive one-site studies, determination of the feasibility of longitudinal studies, and adequate funding.

Guba, Egon G. (1969) "The Failure of Educational Evaluation," Educational Technology 9, 5, 29-38.

The traditional methods of evaluation have failed educators in their attempts to assess the impact of innovations in operating systems. Innovations have persisted in education not becuase of supporting evidence but despite it. One example is the Higher Horizons program in New York City where test data failed to affirm what supervisors, teachers and clients insisted was true - that the program was making a difference. Another example is the Coleman report which states that schools bring little influence to bear on a child's achievement that is not explained by his background and general social context. Although it is generally accepted that this is not true, evaluative techniques fail to detect the effects. The author suggests that the world of evaluation requires reshaping. The author lists and discusses six signs that indicate that evaluation has not been effective: Avoidance; anxiety, immobilization; vague guidelines; misadvice; no significant differences. He then discusses what evaluation has lacked: 1) Lack of adequate definition of evaluation. Evaluation can be defined in many essentially arbitrary ways; 2) Lack of adequate evaluation theory; 3) Lack of knowledge about decision processes. Programs to improve education depend heavily upon a variety of decisions and a variety of information is needed to make and support those decisions; 4) Lack of criteria. The mere collection of data does not constitute evaluation - there is always at least a hint of making judgements about the data in terms of implicit or explicit value structure; 5) Lack of approaches differentiated by levels. The problem of levels, as the term is used here,stems from the fact that the evaluator's traditional point of focus has been microscopic (e.g., the individual student, the classroom, or the school building) rather than macroscopic (e.g., the school district, the state system, or the national network); 6) Lack of mechanisms for organizing, processing and reporting evaluative information; 7) Lack of trained personnel.

Guba, Egon G. and David L. Clark (1974) The Configurational Perspective: A New View of Educational Knowledge Production and Utilization. Washington, D.C.: Council for Educational Development and Research, Inc.

This paper first beiefly reviews and analyzes the historical development of Federal level involvement in educational knowledge production and utilization. This analysis concentrates on the modern era of Federal concern for KPU (1974-74). The views of educational KPU that have emerged during this period are identified and evaluated. The authors concentrate on the systems view which is the conceptual structure currently guiding educational KPU policy. Finally the authors propose an alternative conceptual view, the configurational view. This new perspective is compared and contrasted with the systems view on the dimensions of completeness, realism and balance. The authors conclude that the use of the configurational model to generate Federal policies and programs for educational KPU would result in more productive relationships both between Federal funding agencies and KPU units in the field and among the latter units, by building upon what has been developed by application of systems view and by refining and extending those achievements. Some illustrations of how adoption of the configurational view might affect Federal level policy and programs are then offered.

Hall, G.E. and S.F. Loucks (1981) "Program Definition and Adaptation: Implications for Inservice," Journal of Research and Development in Education, 14, 2:46-58.

Useful inservice training requires that inservice planners understand, define and monitor use of the innovations involved. The authors suggest that one method that teachers, administrators, staff developers and evaluators have found useful in defining innovations and their adaptations involves identifying and defining the operational components of an innovation, then analyzing the pattern of use of the components by teachers. The authors refer to this concept as Innovation Configurations. A configuration refers to the form a process takes on during use. An innovation refers to any program which requires change in behavior of the individuals involved. Defining configurations of innovations and monitoring their use has several implications: (1) inservice content can be targeted more toward teacher needs; (2) inservice can be sequenced and phased to ensure a systematic rational change process; (3) enables development of clear procedures for monitoring implementation of the innovation in the classroom; (4) the concept can help clarify the goals of a change strategy by requiring clarification of what use of the new program means operationally.

Hall, G.E., Loucks, S.F., Rutherford, W.L. and B.W. Newlove (1975) "Levels of Use of the Innovation: A Framework for Analyzing Innovation Adoption," Journal of Teacher Education, 26, 1:52-56.

In this article the authors describe a hypothesized dimension of innovation adoption which attempts to assess what the individual innovation user actually does in using an innovation. The authors assert that innovation adoption is not a decision point but a process which each innovation user experiences individually. Therefore, members of a user system (i.e., teachers, principals) demonstrate a wide variation in the type and the degree of their use of an innovation. In order to account for individual variation in the use of an innovation, the authors have proposed the Levels of Use of the Innovation concept. The Level of Use (LoU) dimension describes the various behaviors of the innovation user through 8 stages which range from spending most efforts in orienting, to managing and finally to integrating use of the innovation. The purpose of the LoU dimension is to describe behaviors of innovation users and does not focus at all on attitudinal, motivational or other cognitive aspects of the user. The authors discuss several implications of the LoU dimension.

Havelock, R.G. (1973) The Change Agent's Guide to Innovation in Education. Englewood Cliffs, NJ: Educational Technology Publications.

This guide to the process of innovation in education was written for educators working for change at all levels of the educational system. It discusses how successful innovation takes place and how change agents can manage their work toward this end. The author presents a six stage change model:

1. Relationship - the successful change agent must first develop a viable relationship with the client system.
2. Diagnosis - after establishing an appropriate relationship, the change agent must guide the client in making a diagnosis.
3. Acquiring relevant resources - seven major purposes of resource acquisition are given under the acronym DAETEIM: Diagnosis, Awareness, Evaluation-before-trial, Trial, Evaluation-after-trial, Installation, Maintenance.
4. Choosing the solution - the author examines four steps in this stage: (a) deriving implications from research; (b) generating a range of solution ideas; (c) feasibility testing; and (d) adaptation.
5. Gaining acceptance - after a solution has been developed and adopted by the change agents, it must be presented to the client system.
6. Stabilizing the innovation and generating self renewal - as the last stage in the change process, the client needs to develop an internal capability to maintain the innovation.

Havelock, R.G. (1968) "Dissemination and Translation Roles," in Knowledge Production and Utilization in Educational Administration, (eds.) T.L. Eidell and J.M. Kitchel. Eugene, OR: Center for the Advanced Study of Educational Administration, University of Oregon:64-119.

The purpose of this paper is to analyze the roles, institutional arrangements and problems involved in the process of linking research information to potential users. There are a number of roles which are linking roles in one way or another. The author identifies eight major types of linker roles: conveyor, consultant, leader, innovator, defender, knowledge-builder, practitioner, and user. The resource system includes the scholar, the researcher, the expert, the producer and packager and applied R&D. The consultant and the conveyor link this system to the client system, which includes the defender, the innovator, the leader and the user. The linker's activities can be grouped into three kinds of processes: getting information (input), processing information (throughput), and distributing information (output). According to the author, there are four things that have to be done in order to build a functioning system of knowledge linkers: (1) build an institution which includes and supports the required roles (installation); (2) recruit candidates to serve in these roles (recruitment); (3) train recruits to fill the roles (training); and (4) supply the equipment necessary to do a good job (equipping).

Hayman, John (1979) The Case for Internal Linkage: Functional Integration within the Organization. Presented at the Annual Meeting of the American Research Association (San Francisco, CA., April 8-12) 32 p.

This paper discusses the increasing attention given recently to change theory and knowledge utilization in education and to the development of dissemination mechanisms in educational systems. Also discussed are the concept of "Linkage," a process of connecting users with resources in an efficacious way, and the role of linkage agent, a person who helps to bring this about. The paper argues that internal linkage agents are more effective in educational systems than external agents, and it attempts to clarify the theoretical and the operational meaning of the term "linkage" as it is being used in educational dissemination and diffusion activities. The paper concludes that knowledge utilization is more than a matter of convenience or desirability. It is a critical matter that relates directly to an organization's survival and its ability to achieve its goals.

Hood, Paul, et.al. (1976) The Educational Information Market Study. Study of Information Requirements in Education. Far West Lab for Educational Research and Development, San Francisco, CA. System Development Corporation, Santa Monica, CA. National Institute of Education (DHEW), Washington, D.C.

Data on the characteristics, information needs, and information dissemination patterns of actual and potential users of educational information were gathered through field interviews with persons representing a variety of educational roles and geographical locations (Vol. I) as well as through a nationwide mail questionnaire survey (Vol. II) questions for the study were generated from an educational information use model which hypothesized relationships between user characteristics, information needs, and information sources employed. Results indicate that while there are many differences among respondents for the variables analyzed, there are distinct patterns of information use related to personal style and type of educational position held. This study forms half of a larger study intended to provide guidance for decision making and planning at all levels in the United States Education Information Service Complex. Appended are the mail survey sampling design and the mail survey instrument.

Hood, Paul D. and Carolyn S. Cates (1978) Alternative Approaches to Analyzing Educational Dissemination and Linkage Roles and Functions. Educational Knowledge Dissemination and Utilization. (Occasional Paper Series), Far West Lab for Educational Research and Development, San Francisco, CA, 109 p.

The objective of this paper is to consider alternative frameworks for the description and analysis of linking agents' roles and functions and to explore the implications of the frameworks for linkage, training and support. Section 1 draws attention to the variety of terms and contexts used in the literature on educational knowledge utilization and draws distinctions between three widely used terms: Knowledge Utilization, Knowledge Transfer, and Planned Change. In Section 2, general orientations toward change are examined from a variety of perspectives. In Section 3, seven widely quoted "systematic" models of change are reviewed in terms of their implications for linking agents, macrosystem linkages, linking roles, and temporary and permanent linking systems. In Sections 4 and 5, recent conceptions of linkage and linking agents are examined and comparisons are drawn among the linking agent roles described in the literature. In Section 6, directions for future development are suggested. The implications of previous conceptualizations and the suggested future directions for linking agent training and support are discussed in Section 7.

House, E.R. (1979) "Technology vs. Craft: A Ten Year Perspective on Innovation," Journal of Curriculum Studies, 11, 1:1-15.

The author sees educational innovation as the systematic attempt to change schools through introducing new ideas and techniques. Technological, political, and cultural perspectives have dominated thought on innovation over the last ten years. The author notes the growing tendency to interpret specific innovations within the context of larger social changes.

House, E.R. (1974) The Politics of Educational Innovation. Berkeley, CA: McCutchan.

The author describes two attempts in Illinois to introduce instructional innovations - programs for the gifted and the PLATO computer assisted instruction program in several colleges. Various aspects of innovation are discussed, including, where it originates, how it spreads among practitioners, and what its consequences are for the internal workings of the school. Internal political and social structures are emphasized as well as how the school relates to larger social and institutional networks. The author believes that face-to-face personal contacts is a primary factor in the occurence and frequency of innovation. Furthermore, an advocate working within the system is required to overcome the rigid political and economic structures within a school if innovation is to succeed. Rather than the usual top down pattern of innovation diffusion, the author suggests greater rewards for and promotion of initiatives at the bottom.

House, E.R., et al. (1972) "A Test of the Research and Development Model of Change," Educational Administration Quarterly, 8, 1 (Winter):1-14.

This study questions the "research and development" model, which has been the basic educational change strategy employed by the Office of Education and other top policy groups for the last several years. The implication is that educational change is more dependent on the internal workings of the school district than on feeding carefully engineered products to practitioners.

The authors suggest that the "social interaction" change model, which sees change as the result of the social relations network within the adopting unit, is more appropriate than the R&D model.

House, E.R. (1971) "A Critique of Linear Change Models in Education," Educational Technology, 11, 10.

The author argues that the Clark-Guba model of educational change - with its four distinct functions of research, development, diffusion, and adoption - is not very successful. A primary reason is that the model incorrectly assumes that actors at various stages are pursuing similar goals or are held accountable to a common goal by some force. The general belief in this model may reflect the bias of people's desire for rationality and order.

Hull, William L., et.al. (1978) "Research Needs in Diffusion, Change and Information Systems." Presented at an Invitational Conference on Research on Dissemination and Utilization in Education at the University of Texas.

Through an examination of the background and current status of programs at the National Center for Reserach in Vocational Education, one can identify many research problems and issues. Some of these current National Center Programs include a diffusion program (combining five U.S. Office of Education-sponsored projects) Research and Development (R&D) efforts (focusing on operational problems in National Center Diffusion and Information Systems) and information system activities (including the Eric Clearinghouse on Adult, Career, and Vocational Education, the National Center Clearinghouse, and the Resource and Referral Service) based on these and past activities, eight issues can be identified as potential research topics concerning educational dissemination and utilization: 1) A discrepancy exists between national priorities and local user needs for the dissemination of R&D results; 2) Communication processes need further development; 3) Practitioner capability to obtain and use R&D information needs strengthening; 4) Diffusion of innovation strategies have not been validated; 5) Information about exemplary programs is not valid or reliable; 6) Methods of conceptualizing and measuring the impact of R&D based information have not been developed; 7) The issue of selective versus comprehensive information systems needs resolution; and 8) The roles and relationships of public and private agencies active in dissemination and utilization need clarification.

Hurst, Barbara Martin (1979) Ordering Theory: A Methodology For Sequencing Stages of the Adoption Process. Presented at the Annual Meeting of the American Educational Research Association (San Francisco, CA, April 11) 26 p.

This paper describes a method of research to examine the process of effecting educational change through adopting innovative ideas. Twenty-nine elementary tearchers in the process of adopting a complex curricular innovation were studied. Because of the complex nature of this process, ordering theory was used as the method for analyzing the adoption stages. Ordering, a method of defining both linear and non-linear sequencing, measures both sequential skill development as well as the degree to which positive attitudes are necessary in the adoption process. Results indicate that adoption involves four levels: Formation of a positive attitude toward the innovation, acquisition of general knowledge and concepts, a combination of further knowledge and increasing positive attitudes, and refinement of knowledge and use of the innovation. The use of ordering theory was deemed appropriate in that it provides a more thorough analysis of the research data. Utilization of this research methodology should change the nature of research efforts and the way in which innovations are introduced into school systems.

Iannacoone, Lawrence (1976) Using Research in School Reform, 8 p.

This paper suggests that there is an underlying political revolution in educational governance. Furthermore, there is a need for concern with the changes needed in the roles of researchers and state policy level policy makers in order for research to play a significant part in helping shape reform in education. Given the present political conditions there are unusual dangers for researchers trying to serve state policy makers. The initiative for educational changes has shifted from the local district to the national government and subsequently to state leadership. The legislative patterns of recent years have increased further the separation between responsibility and operation. Increased centralization at the state level is combined with the creation of multiple new points of access in educational governments ranging from teacher negotiations to site level parent advisory committees. This is the context within which the state policy maker is asking the educational researcher to provide data for his predetermined solutions. The researcher is asked to make antithetical policies work despite their inconsistencies. The central question for the educational research community concerns the nature of the research community's role in educational policy making.

Iannacoone, Lawrence (1975) "The Field Study in Educational Policy Research," Education and Urban Society, Vol. 7, No. 3, pp. 220-238.

Discusses the character of the field study and its place in the scientific venture, notes the characteristic attitude toward the relationship between data and hypotheses held by the field researcher, addresses the requirements of educational policy research, and explores the fit between these and the field study's character.

Jenkins, Jerry (1977) Research in Elementary and Secondary Education (Fool's Gold?) Presented at the Annual Meeting of the American Educational Research Association (New York, NY, April) 13 p.

This paper contends that much of what passes as "educational research" has all the appearance, but little of the substance, of scientific research and that the educational community should realize this fact and condemn the imitation, while working to improve scientifically based and conducted projects. Problems in the field center around (1) the mechanisms, attitudes, political structures, and reward systems existing in elementary and secondary education; (2) the time span allowed in developing proposals and conducting research and for results to become evident; (3) the self-reinforcing attitude of distrust and doubt among educators, who are wary of new research because of previous unfavorable research, responsibility for changing the quality of research rests in four basic areas: (1) the financial support system, (2) participatory school systems, (3) the researchers, and (4) research training programs. Given the problems involving current systems which do not, and cannot, effect rigorous applied research in education and the general distrust regarding research as an effective change agent, the author makes nine recommendations to improve the situation, involving (1) organizational systems, (2) legal status of research organizations, (3) regional orientation, (4) materials and equipment identification and acquisition, (5) model research activities, (6) communication and implementation of data, (7) information dissemination, (8) communication and implementation of successful programs, and (9) feedback into training programs.

Kean, Michael (1980) Research and Evaluation in Urban Educational Policy. ERIC/CUE Urban Diversity Series, No. 67 (June), NIE, Washington, D.C., 25 p.

A study conducted by the school district of Philadelphia and that city's Federal Reserve Bank, entitled "What Works in Reading", was used as a case study to determine what factors influence the translation of research findings into educational policy. The Philadelphia study, which examined variables associated with achievement growth in reading, received extensive nationwide media attention and was used by the Philadelphia School superintendent's office in the development of recommendations for changes in reading instruction. Analysis of the study's design and of the methods used in disseminating its findings resulted in the identification of ten factors associated with its being translated into educational policy: 1) identification of the clients affected by the study's findings, 2) vitality of the topic, 3) participant involvement, 4) technical quality, 5) reporting formats, 6) findings keyed to the decision process, 7) preparation of policy makers, 8) overcoming resistance, 9) the role of the ombudsman, 10) the role of the entrepreneur. Factors associated with research utilization in urban areas were also identified.

Ketefian, Shake (1974) Sources of Knowledge Utilization Curriculum Change in Nursing Education. Presented at the Annual Meeting of the American Educational Research Association (59th, Chicago, Illinois, April) 25 p.

A study was conducted to suggest an answer to questions in nursing education concerning what educational changes are necessary, which directions those changes should take, and what type of approach should be used to introduce them. The study investigated the extent to which scientifically obtained knowledge is utilized in the process of change in nursing education, using selected innovations as the focus for the study. Information was obtained through a national survey of current curricular innovations in nursing as was determined by questionnaire and through a small number of case studies. The case studies indicated that there were various stages in each innovation process for each curriculum change. Several different modes of identifying the knowledge needed were determined in an attempt to classify the approaches used for deriving knowledge. The quality of the evidence was not assessed, however. A literature review pertaining to sources and methods of obtaining knowledge was utilized. (A 36-item bibliography and a classification scheme for the approaches used in deriving knowledge are also included).

Kievit, Mary B. (1975) Vocational Education Research and Development as a Factor Influencing Teachers to Change Practices. Washington, D.C.: National Academy of Sciences National Research Council, 57 p.

With particular attention to vocational research and development, this study reviewed the literature to obtain information on the factors or influences causing teachers to change practices. Research and development in vocational education was treated as an independent variable in an experimental research design with moderating variables of product characteristics, dissemination efforts, teacher education, work context, and teacher characteristics. The sources of information included a number of reviews of research, research monographs, and expert opinion statements. Very limited empirically derived evidence was found regarding the extent to which vocational research and development has influenced teachers to change practices. Speculation based on informed opinion concluded that: (1) The influence of curriculum development and distribution on teacher practice is relatively insignificant; (2) Use of dissemination through institutes, workshops, and conferences is inadequate as an influence on teacher practice; (3) Teacher education as a mode of dissemination is of negligible influence; and (4) Teacher educators as disseminators of research and development are limited in influencing teachers to change practices. Possible explanations for the low return in terms of actual change of teacher practice are offered pertaining to organizational factors and to systems for analyzing the characteristics of educational innovations.

Kleinberger, Sharon (1976) "Research and Policy Making in Education," Studies in Educational Evaluation, Vol 2, No. 3, pp. 215-26.

Various educational practices resulting from research recommendations and the associated problems are described. The author suggests that educational research can create a more reliable foundation for policy decisions concerning the introduction of reforms, by evaluating their resulting effectiveness. Investigators should suggest more pertinent questions and introduce revolutionary innovations.

Krathwohl, David R. (1974) "An Analysis of the Perceived Ineffectiveness of Educational Research and Some Recommendations," Educational Psychologist, Vol. 11, No. 2, pp. 73-86.

The author examines, in the light of funding problems for federal agencies supporting educational research, the difficulties inherent in the research process as it now exists, and methods for attacking these difficulties. The thought is presented that only by working on these general problems, will the more specific problem of funding be effectively solved. Comments are presented on one aspect of educational research: That it is perceived as having little impact upon practice. Explanations of this perception center on (1) The role of dissemination, and the relatively little funding devoted to it; (2) The role of research as a legitimizer of practice, rather than as an initiator of change; (3) The gap between researchers and research users, in which researchers are the "professionals" and users a less knowledgeable "public"; (4) The nature of scientific models, in opposition to the humanistic concepts employed by users; (5) The problem of "proof" and "truth" in educational research - when is something "proven true" suggested remedies include (1) Increased attention to dissemination; (2) Increased attention to the demonstration of theoretical sources of practice; (3) Increased emphasis on research rationale, the development of theory, and the integration of research into new wholes; and (4) Attention to bridging the gap between researcher and user through increased awareness of the gap and its effects, through the use of classrooms for research settings, through an emphasis on success in practice as the final proof of research validity, and through modification of research development models to include more teacher involvement.

Leithwood, K.A. (1981) "Managing the Implementation of Curriculum Innovations," Knowledge: Creation, Diffusion, Utilization, 2, 3:341-360.

The thesis of this article is that a major problem contributing to the lack of systematic knowledge utilization in the school system is the neglected development of demonstrably effective strategies for transforming knowledge into defensible courses of action. The author outlines a strategy, or theory of action, consisting of a sequence of major tasks and procedures for their accomplishment.

The framework, with implementation defined as a reduction in the gap between current and preferred status, consists of three concepts (growth, system, and action) and the relationships among these concepts. For the purpose of developing the strategy for managing the relations among these concepts and the implementation process, three tasks are discussed: diagnostic, application, and evaluation tasks.

The author describes the above concepts and provides case examples of each task.

Leithwood, K.A. (1981) "The Dimensions of Curriculum Innovation," Journal of Curriculum Studies, 13, 1:25-36.

The purpose highlighted by this paper is the planning and monitoring of curriculum implementation. The author proposes the concept of an innovation profile to aid in this planning and monitoring process.

One critical task in the development of an innovation profile is the identification and choice of components or dimensions of an innovation. Nine curriculum dimensions are identified, the attributes of each are defined, the nature of their contribution to the effects of a curriculum are outlined, and a justification is provided for their inclusion in an innovation profile. The paper is intended to serve as a brief yet comprehensive source of dimensions for those attempting an implementation analysis; the criteria to be employed in selecting from the array of dimensions those most suitable to a description of a particular innovation are outlined.

Levin, Henry M. (1978) "Why Isn't Educational Research More Useful?" Prospects, Vol 8, No. 2.

The author asserts that the problem of "usefulness" of educational research will be a continuing one no matter what the quality or level of volume of research. The author suggests that the problem of usefulness is a function of the different contexts and methods that characterize the research and policy functions. He suggests that the following aspects are important. First research must address the specific questions of the policy maker. Second, research must meet the time requirements of the policy maker. Third, research must be written in such a way that it is understandable to people who are not experts in educational research. Fourth, the research must take into consideration the political constraints of the policy maker. The author goes on to argue that there should be a tension between educational policy and research. They represent two different cultures with different requirements.

Lortie, D.C. (1975) School Teacher. University of Chicago Press.

The main purpose of the book is to identify the pattern of orientations and sentiments which is peculiar to teachers and which distinguishes them from members of other occupations. The author argues that the pattern derives from both the structure of the occupation and the meanings teachers attach to their work. Part I of the book (Ch. 1) is a chronological review of selected structural features of teaching (e.g., money rewards, social position) in which continuity and change over three centuries of American history is explored. The second part (Ch. 2, 3, 4) deals with recruitment, socialization, and the distribution of career rewards. These processes give rise to orientations of conservatism, individualism, and presentism among teachers. Part 3 (Ch. 5, 6, 7, 8) emphasizes the meanings teachers give to their tasks and the sentiments they generate while carrying them out. The subjects include teachers' goals, problems of teaching, the general sentiments of teachers, and teachers' preferences about their day-to-day interactions. Part 4 (Ch. 9) centers on three scenarios which might unfold in the future.

Louis, K.S. (1981) "External Agents in Knowledge Utilization," in Improving Schools: Using What We Know, (eds.) R. Lehming and M. Kane.

The purpose of this paper is to explore the ways in which external agents (e.g., consultants, change agents, linking agents) affect school improvement and knowledge utilization at the local level. In addition to the synthesis of relevant literature, the author indicates gaps and deficiencies in the current understanding of the role of external actors. First, she points out that there is a serious lack of theoretical frameworks in which the study of external roles might be located. Second one of the main deficiencies of existing research is the emphasis upon a single function of knowledge use (instrumental decisionistic) and a single type of knowledge (externally generated research information). Third, the limited context of knowledge use research has also placed limitations on the research about the role of external agents. Research investigating the role of external agents has tended to view the external agent largely within the context of the "technological push" framework. The author argues that research on strategies and tactics must be firmly based in a framework for understanding knowledge use settings at the local level and in an improved understanding of "demand-pull" based knowledge utilization as well as "technological push." The author recommends that more attention be paid to the ways in which organizations act as external agents (e.g., modeling organizational information networks at the user level). In addition particular attention should be paid to organizations which are conscious agents, those that have power relationships with school districts and those that have a potential for becoming more consciously client and information-use oriented at the institutional level.

Madey, D.L. (1981) "Some Benefits of Integrating Qualitative and Quantitative Methods in Program Evaluation, with Illustrations," Educational Evaluation and Policy Analysis (in press).

This article advocates the integration of qualitative and quantitative methods, illustrates the argument through a discussion of a federal educational program evaluation, the State Capacity Building Program, and summarizes the benefits and costs of such methodological triangulation.

The article's major thesis is that the integration of quantitative and qualitative methods within a single evaluation has synergistic effects in the three major phases of the research process: design, data collection, and analysis. After reviewing the historical debate between advocates of the two methods, the State Capacity Building Program and its evaluation are briefly described. The article deals first with the contributions of qualitative methods to quantitative work; then, conversely, the contributions of quantitative to qualitative methods are examined. A separate section explores some of the costs involved in such a methodological marriage. In a concluding section, the applicability of integrated methodologies to other evaluations is explored.

Mahan, J.M. (1972) "Frank Observations on Innovation in Elementary Schools," Interchange, 3, 2-3:144-160.

Instructional innovation in the elementary school often is reported in educational literature as superficial and/or compromised. This paper presents curriculum installation guidelines and recommendations for consideration by educators responsible for effecting intended curriculum change. Based on intensive field experiences in more than 60 schools of diverse characteristics, and supported by survey responses of innovating administrators and teachers, the guidelines reveal actual implementation problems that impede and endanger curriculum change efforts. Educators involved in curriculum change are encouraged to transform their theoretical models for change into concrete, replicable activities (work) and events that directly deal with the field problems that stimulated the guidelines. References are made to a series of curriculum installation projects that were progressively more successful because the guidelines were formulated and made operational in the field.
(author modified)

McCracken, J. David and Wilma B. Gillespie (1973) Information Needs of Local Administrators of Vocational Education. Final Report. Ohio State University, Columbus, OH. Center for Vocational and Technical Education. National Institute of Education (DHEW), Washington, D.C.

Research findings often fail to reach key decision-makers either in the proper form or in time to assist in decision-making. Also, little is known about major problems for which local directors need information, methods of seeking information used by these decision-makers, information normally used, or the criteria employed in selecting information. The purpose of this study was to identify the critical problems of local administrators of vocational education and the information sources they utilize. Data were collected from certain local administrators, selected by a stratified random sampling technique, through the use of telephone interviews and a mail questionnaire. Major conclusions include: (1) Local administrators generally perceived little need for information for use in problem resolution, (2) Most decision-making was in the absence of an information search, (3) Respondents desired experienced people as their major information source, and (4) The major criteria for utilization of print materials were the familiarity or degree of experience of the administrator with the materials, and the content quality.

Menges, Constantine Christopher (1978) Knowledge and Action: The Use of Social Science Evaluations in Decisions on Equal Educational Opportunity, 1970-73. National Institute of Education (DHEW), Washington, D.C., 73 p.

This report analyzes why the federal government has made little use of evaluation studies and data available on equal education and school integration. An overview is provided of federal policy and action on equal education from 1970 to 1972. The utilization of evaluations in the areas of educational and social effects of desegregation, criteria/incentives for maximum feasible desegregation, and compensatory education and achievement are discussed. Also traced are political, bureaucratic, and intellectual factors which affected the extent to which evaluations shaped federal policy. It is held that with more communication between legislative staff and researchers, valid social program evaluations can be chosen and cumulatively synthesized, in order to apply them to decision making and policy.

Miles, M.B. (1981) "Mapping the Common Properties of Schools," in Improving Schools: What We Know, (ed.) R. Lehming. Santa Monica, CA: Sage.

The purpose of this paper is to summarize what seems to be known about the "common properties" of schools on an empirical basis, to assess the explanations offered for the presence of such properties, and to outline an agenda for future research, both to provide more descriptive data and to test competing explanations. The common properties of schools, as abstracted from a thorough literature review, are discussed according to nine dilemmas encountered by school systems. These dilemmas are created by the interaction of schools' common properties and the primary tasks of schools, and occur at all levels of the school system. Each dilemma is explained, a critical review of regularities is presented, causal questions are addressed, and a listing of knowledge gaps (issues where more empirical data are needed) are discussed.

Miles, M.B. (1965) "Planned Change and Organizational Health: Figure and Ground," in Change Processes in the Public Schools, R.O. Carlson, et al.. Eugene, OR: Center for the Advanced Study of Educational Administration, University of Oregon:11-34.

The author contends that those concerned with innovation have tended to focus on the effectiveness of the innovation itself and to neglect the readiness of a specific organization to absorb the innovation. The author attempts to correct that deficit and identify factors of organizational health in relation to utilization of innovation. He formulates nine dimensions of organizational health. The author notes, however, that educational organizations have certain properties which tend to diminish their organizational effectiveness. These include goal ambiguity, input variability (i.e., they must accept a wide variety of students), role performance, invisibility, low interdependence, vulnerability, lay professional control problems and low technological investment. The author then suggests specific interventions to improve organizational health: (1) team training; (2) survey feedback; (3) role workshop; (4) target setting and supporting activities; and (5) organizational diagnosis and problem solving. These five means of intervention have the following common principles: self study, relational emphasis, increased data flow and expert facilitation.

Miles, Mathew B. (1964) "Innovation in Education: Some Generalizations." In M.B. Miles (ed.) Innovation in Education, New York: Bureau of Publications, Teachers College, Columbia University.

This paper discusses innovations in education. Although the merits of the innovation itself are rarely the major determinants with respect to adoption, some properties of the innovation do have a bearing on adoption. The following are some properties which affect adoption: 1) innovations requiring inordinate outlays of time or money by the adopting group are likely to move slowly; 2) ease of discard if the innovation is unsatisfactory; 3) congruence with the potential adopting system. Most innovations appear to be stimulated by some active person or group. Innovators tend to be in positions of authority and have contacts with co-workers. Group sponsored innovations tend to be moderate and implementation is often facilitated by creation of a temporary system. Relevant characteristics of target organizations include the strength of the forces working for stability, and cultural attitudes affecting change. The process of implementing change needs careful planning and should include attention to diffusion, reduction of pressures on decision makers and use of linkage. Two models of change are discussed: 1) one formulation begins with development of interest in an innovation and ends with a decision to adopt, adapt or reject; 2) another formulation begins with criticism of existing programs and ends with action on decisions about the innovation. The optimal conditions for change to take place are: design requires a protected, autonomous environment; diffusion is best done dispassionately and credibly; visits to observe operation of the innovation and potential adopters to evaluate the innovation; during adoption the user needs support.

Mitchell, Douglas E. (1978) *Social Science Utilization in State Legislative Policy Making*. Presented at the Annual Meeting of the American Educational Research Association (Toronto, Ontario, March 27-31) 25 p.

In this paper, social science utilization is studied as an aspect of legislative decision making. The purposes of the paper are to provide a review of political science literature on state legislatures, offer a theoretical framework for interpreting utilization of social science research, apply the framework to interview data, and generate a theoretical framework to test additional social science utilization hypotheses. In 1977, nearly 100 legislators, staff members, executive branch personnel, and interest group spokesmen dealing with educational legislation in Arizona, California, and Oregon were interviewed regarding legislative issues and influences. Data from these interviews suggested that policy makers continually confront situations in which pressures to act are diverse, incessant, intense, and difficult to identify clearly. A theory of social science utilization was developed which was in accordance with data from these interviews and from literature on state legislatures. The theory was based on three major elements: 1) Location of points within the legislative policy-making process at which social science findings might be expected to have a significant impact; 2) The linkage system which ties social science research to utilization in the policy process; and 3) Orientational frames of reference which influence legislators to utilize social science and/or other resources in decision making. Hypotheses based on this theoretical framework will be used to test the nature of legislative issues and the background and attitudes of legislators.

Mitchell, Douglas E. (1980) "Social Science Impact on Legislative Decision Making: Process and Substance," *Educational Researcher*, November 9-19.

In this study, data were collected from 160 key legislative policy influentials in three states. Each respondent was asked to: 1) describe recent legislation in one or more of the six issue areas; 2) identify the key actors who formulate and influence these legislative decisions; 3) discuss how the legislature is influenced by these key actors; 4) define "the issues" being resolved as legislation is enacted; and 5) identify the resources utilized to control or influence the decision making process. Based on their interview data, the author defined four distinct stages of legislative policy making: articulation; aggregation; allocation; and oversight. The author suggests that social science serves different intellectual and social functions during each of the four stages: During the *articulation phase* social research findings make intellectual contributions through policy problem definition and fulfill the social function of building group solidarity within major interest groups. During the *aggregation phase* research makes intellectual contributions through persuasion and coalition building which the author refers to as problem solving. The social function of research findings at this phase is the creation of a coalition of support. During the *allocation phase* the intellectual function of research is achieved through evidence assessment. Socially, utilization at this stage means debate winning. During the *legislative oversight phase* the major intellectual contribution of social science research is one of performance evaluation. The social science utilization, in this phase, tends to become a vehicle for the mobilization of criticism. On the basis of his data, the author makes three basic conclusions regarding social science utilization within state legislatures: 1) social science is only one of four distinct types of expert authority influencing legislative decisions; 2) the utilization of social science contributes to both intellectual and social aspects of decision making; 3) the contributions of social science shift as legislative proposals move through the phases of decision making.

Nash, Nicholas and Jack Culbertson (eds.) (1977) Linking Processes in Educational Improvement: Concepts and Applications. Columbus, OH: University Council for Educational Administration.

This volume is designed to achieve several objectives - to produce for educational leaders an up-to-date synthesis on the role of linking agents and agencies in educational improvement activities and, in the process, to identify and discuss important knowledge utilization issues of interest to the research, development, and training communities; to address the immediate realities that internal and external linkers confront and to shed light on the kinds of organizational, human, and knowledge resources available to them; and to provide better bases for advancing linking through new plans and developments. The organization of this volume is intended to illuminate the role of those linking agents engaged in or providing support for improvement in local educational agencies, either internally or externally. The volume synthesizes key concepts and findings about change processes, uses of knowledge in change, the management of change, the functions of linking agencies in improvement activities, the attributes and skill clusters needed by external linking agents to function effectively, and a national training system for both internal and external linkers.

Orfield, Gary (1978) "Research and the Antibusing Debate." Law and Contemporary Problems, V 42, No. 4, pp. 141-73.

Examines several obstacles to the effective use of social science research in school desegregation controversies and discusses the needs of judges, administrators, and elected officials who must make decisions concerning desegregation plans.

Paul, Douglas A. (1977) "Change Processes at the Elementary, Secondary and Post-Secondary Levels of Education." In Nash, N. and J. Culbertson (eds.) Linking Processes in Educational Improvement: Concepts and Applications. Columbus, OH: University Council for Educational Administration.

The purpose of this review is twofold - to summarize the major models of educational change and to present a series of generalizations based on recent empirical studies about educational change. In the first section, previous reviews of the change literature are presented in order to establish a broad perspective concerning research in this area. Three dimensions of change-processes, influences, and effects-derived from previous research and from the empirical studies cited in section 2 are proposed as a succinct means for classifying the wide variety of research on change. Four models of change-problem-solving, social interaction, research-development-diffusion, and linkage are described and compared using the three dimensions. Studies associated with the models are cited and a summary of the models is attempted by using conceptualizations about change strategies and images of practitioners. In section 2, over 100 empirical studies completed since 1970 are analyzed in order to provide the basis for a series of generalizations and inferences about change. Each generalization or inference is judged as "firm," "moderately speculative," or "speculative." These judgments accompany each generalization. A bibliography is included.

Paul, Douglas (1975) A Conceptual Framework for Studying "Knowledge Utilization". Presented at the Annual Meeting of the American Educational Research Association (Washington, D.C., April) 38 p.

This paper, written from an organizational perspective, begins with an examination of the deficiencies of knowledge utilization and educational change literature. It suggests the explication of descriptive and heuristic conceptual dimensions as one approach for facilitating a descriptive perspective of knowledge utilization. The efficacy of three descriptive and heuristic dimensions (systems, processes, and characteristics) are explored, along with a fourth dimension, utilization, which is the dependent variable in many studies of knowledge utilization. A framework for classifying knowledge utilization research, based on these four dimensions is constructed. The paper contains a bibliography of educational change literature.

Paulston, Rolland G. (1979) Paradigm Conflict in the Assessment of Educational Reform: Evaluation as Social Critique. 49 p.

Traditional quantitative-experimental models of evaluation have failed to contribute to educational reform; they should be supplemented by qualitative-subjective models, which can be grouped under the rubric of naturalistic, or non-experimental evaluation. This naturalistic approach does not attempt to be value-free; rather, it recognizes that evaluation is highly political, trying to balance the conflicting values of evaluators, policy-makers, and educational planners, by stressing context rather than method. Existing evaluation models can be grouped under two research paradigms, which relate social change theories to educational reform: Equilibrium/liberal and critical/conflict. The former is associated with traditional criteria like measurement, cost-effectiveness, and social efficiency; the latter assumes political conflict and stresses balance of power and social justice. Conflicting theories of social change influence both the definition of educational reform and the choice of evaluation method, standard, and outcomes - a distinction which metaevaluation has ignored. In conclusion, a dialectic strategy is recommended that evaluators can choose between the two paradigms and among the methods within paradigms.

Pellegrin, Roland J. (1965) "The Place of Research in Planned Change." In R.O. Carlson, et.al. Change Processes in the Public Schools, Eugene, Oregon: Center for the Advanced Study of Educational Administration, University of Oregon, pp. 65-75.

In this article the author discusses the need for reliable research as a basis for planned change in education. According to the author, educational decision makers lack appreciation and understanding of the nature and value of research and rely heavily on authority to justify existing practice and policies. Intuition and common sense seem to be the major premises for innovation. The author suggests several obstacles which must be overcome before educational research can provide reliable knowledge on which to base policy, practice and innovation. These obstacles are: a widespread lack of appreciation for and understanding of the nature and value of research; much existing research is low in quality, weak in the insight it imparts, and of dubious utility to the practitioner; the nature of functions of "theory" are poorly understood. For many practitioners, the term is an antonym for "practicality"; there is considerable confusion about the relationship between empirical fact and values; research on topics important to education covers a wide range, many of which are complex and difficult to investigate. The author asserts that for educational research to be reliable enough to be used as a basis for practice, it must be either: 1) the testing of well-defined but isolated hypotheses or, 2) research directed by systematic and integrated theory.

Pincus, John (ed.) (1980) Educational Evaluation in the Public Policy Setting
Santa Monica, CA, Rand Corporation.

This monograph is composed of 5 essays which criticize from federal, state and local perspectives, current methods of evaluating government sponsored education programs. A major recurring theme is that experimental design methods do not provide adequate information for policy makers' needs. Chapter One of the report summarizes the main findings of Chapter Two through Five, and discusses a possible new approach to evaluation through the social effects of government programs. Chapter Two is a critique of the experimental design approach, with recommendations for new perspectives on evaluation. Chapter Three analyzes federal program evaluation from the local perspective, and argues that present evaluation methods are generally not useful from the local perspective. Chapter four describes an Executive Branch attempt to evaluate Title I of the Elementary and Secondary Education Act on behalf of Congress. The strategy adopted was to define the aims of the evaluation in light of Congress's policy making authority and concerns. Chapter Five discusses how education programs can be more successfully evaluated at the state level. These essays offer a generally consistent set of views on the current state of program evaluation in the federal education system.

Pincus, J. (1974) "Incentives for Innovation in the Public Schools," Review of Educational Research, 44, 1:113-144.

This paper sets out conceptual propositions about the structure and incentive systems of public schools as they relate (1) to the adoption of innovations and (2) to their implementation in the schools. These propositions have systematic implications for educational R&D policy as well as for such broader questions as how to implement planned change in bureaucracies.

The general thesis of the paper is that the market structure of the public school as an "industry" has a major effect on schools' decisions to adopt innovations, and the bureaucratic structure and incentives of schools shape in specific ways the transition from adopting innovations to implementing them. The objective of the paper is to lay the groundwork for a testable theory which integrates the incentive effects of both market structure and bureaucratic structure.

The article concludes that given competing demands in the public utility market of the schools, diversity of approaches to schooling will have to take place primarily in a public marketplace, and that this diversity, rather than the preservation of the existing institutional order, should be the focus of R&D policy.

This paper moves in the direction of specifying a model of how school systems behave in response to opportunities for change. The author suggests five broad emphases for R&D policy in encouraging adoption of educational innovations:

1) large-scale experimentation;
2) collaboration between R&D agencies and educational leadership networks;
3) case studies of successful and unsuccessful innovation;
4) research that will improve the R&D community's understanding of the existing pattern of incentives in the public schools;
5) trying out methods of restructuring system incentives (e.g., changes in market structure; changes in locus of control; changes in individual incentives; and clear standards of accountability better information systems).

Pine, Gerald (1979) "Teacher Adaptation of Research Findings Through Inservice Education." Washington, D.C.: Teacher Corps, Office of Education.

A program designed to adapt educational research findings to practical classroom use is described. A variety of options for adapting research through inservice education are described. They include formal university courses after school, released time programs, one to one and small group consultations, independent study, graduate research theses, visitations, professional conferences, team planning meetings, and support for teacher action research and pilot program proposals. Proposals for action research and pilot programs are supported by the project for materials, consultative services, and publications and dissemination. The program is designed to accommodate different styles and paces of teachers.

Powell, Marjorie (1978) Utilization of Research by a Policy-Making Regulatory Agency: A Case Study. Presented at the Annual Meeting of the American Educational Research Association (62nd, Toronto, Ontario, Canada, March 27-31) 18 p.

The California Commission for Teacher Preparation and Licensing, responsible for teacher certification and approval of programs of teacher education, is conducting a major research effort to identify teaching behaviors that are related to student learning of reading and mathematics in the elementary grades: The beginning teacher evaluation study, while the results will not indicate which specific policy alternatives should be adopted, they will have, and already have had, an impact on the thoughts and actions of the members of the policy making body. Policy makers have modified their conceptions of teaching and teacher education; learned about the research process and used research to answer other questions; used results in their individual work; and heard the results quoted by individuals arguing for specific policy decisions. In addition, those subject to the regulations of the Commission have become more aware of and concerned with the results of research on teaching. Specific examples are discussed to elaborate each of these uses of the research results.

Schalock, H. Del and G. Roger Sell (eds.) (1972) The Oregon Studies in Educational Research, Development, Diffusion, and Evaluation. Volume III: Conceptual Frameworks for Viewing Educational RDD&E. Final Report. Washington, D.C.: National Center for Educational Research and Development (DHEW/OE)

This volume represents the output of a yearlong effort to clarify and firm the conceptual base that underlies educational RDD&E. It contains three commissioned papers authored by Drs. Henkrik D. Gideonse, Gene V. Glass and Blaine R. Worthen, and by Leslie J. Briggs and one paper prepared by H. Del Schalock and G. Roger Sell of the staff of the Oregon studies. The volume also contains a formal critique of each paper, an author response to each critique, and an introductory and summary critique of the papers as a set. Individually, the papers deal with one or more aspects of the domain of educational RDD&E. Collectively, they deal with the domain as a whole. As a set, the conceptual papers and their critiques are intended to serve as (1) a benchmark document with respect to the conceptual structures underlying educational RDD&E, (2) a primary reference for persons entering the field of educational RDD&E, and (3) a stimulus to the continued dialogue that these papers have only begun.

Schmuck, R., Runkel, P., and D. Langmeyer (1969) "Improving Organizational Problem Solving in a School Faculty," Journal of Applied Behavioral Science, 5:455-482.

The purpose of this project is to test whether improved organizational problem solving could be produced in a school faculty by training in interpersonal communication skills. The intervention is pointed toward organizational development and remained fixed on organizational roles and norms and their interrelationships. The major training goals are developed out of a conception of flexible organizational problem solving (communication, participation, etc.). Evaluation of the effects of training show a need for applying techniques learned and also a quality of relationships improved. In final evaluation the strengths and weaknesses of the intervention are discussed. In conclusion, the authors contend that this project is salutary for a school faculty and contains valuable lessons for consultants or change agents.

Schmuck, R. (1968) "Social Psychological Factors in Knowledge Utilization." In T.L. Eidell and J.M. Kitchell (eds.) Knowledge Production and Utilization in Educational Administration. Eugene, Oregon: Center for the Advanced Study of Educational Administration, University of Oregon.

The focus of this article is a theoretical analysis of problems of knowledge utilization in education. Based on this analysis, the author develops a plan for training administrators and staff to be more receptive to research. According to the author, social relationships between behavioral science researchers and administrators are characterized by hostility and resistance which impedes utilization. The author suggests that there are ten social psychological assumptions which must be considered in planning action to facilitate research utilization. Included among these are: there must be trust, openness and attraction between the administrator and the researcher if there is to be effective communication; cooperation activity should be structured so that each will benefit directly from it; at the start of any collaboration, there should be a discussion of the forces which might impede either side's participation. The author then outlines ten stages which should be present in the design of a training program for the development of an individual administrator. In addition, the author suggests eight stages for modifying the faculty's expectations and pressures that support the status quo.

Short, Edmund C. (1973) "Knowledge Production and Utilization in Curriculum: A Special Case of the General Phenomenon." Review of Educational Research, 43, 237-301.

This paper surveys the general literature on knowledge production and utilization and explains how this field differs from more pragmatic approaches. It deals with three domains of interest: knowledge production, knowledge utilization and the relation between the two. The author examines each domain of interest from three perspectives: 1) studies related to KP&U in general, studies related to education in general, and work more specifically related to curriculum. He provides an extensive bibliography encompassing all three perspectives.

Short, Edmund C. (1973) "Tasks of Technical and Public Policy Experts in Educational R&D." 27 p.

In order to develop and implement new governmental policies in educational research and development (R&D) which meet the needs of R&D specialists and the concerns of the public, it is important to understand the complexity of the research-development-knowledge utilization cycle and to develop a strategy which serves the public interest but reserves to the R&D specialists those decisions and technical activities which only they can adequately carry out. The guidelines of such a strategy are that a) A philosophy of the government's role in R&D should be developed and promulgated through appropriate legislation; b) A permanent secretariat, responsible for developing and implementing the role statement formulated, should be established by legislation; c) the educational R&D community should be granted financial assistance at the local, state, regional, and national levels to establish its initial organization and governing procedures, for the determination of its priorities, for the identification of continuing sources of revenue for the support of research, and for the dissemination of the results of R&D work; d) Each R&D institution should receive unencumbered grants of money for allocation to specific knowledge-producing project applicants; e) A system by which knowledge can be readily communicated to the practitioner should be developed; and f) No policies should be set which diminish the effort that has to be given to studies related to the ongoing operation of particular systems or programs.

Sieber, S.D. (1981) "Knowledge Use in Public Education: Incentives and Disincentives," in Improving Schools: Using What We Know, (ed.) R. Lehming and M. Kane. Beverly Hills: Sage Publications.

In an attempt to study knowledge use in education, this paper takes into account the perspectives, sensibilities and aspirations of school personnel in various settings. These considerations provide a paradigm for studying educational change which requires understanding incentives for change, in general, and incentive systems in educational settings, in particular. This paradigm assesses incentives and disincentives at both the individual and the organizational level. Among various classifications of incentives and disincentives, this paper mainly employs a taxonomy characterized by external vs. internal sources of knowledge use incentives/disincentives in educational change. In general, this paradigm attempts to understand the customary rewards and changes that threaten these rewards (knowledge use disincentives), on the one hand, and those ways in which knowledge use efforts might contribute to acquisition of preferred benefits (knowledge use incentives). Finally, the paper briefly refers to some major dimensions for depicting the incentive structure of local settings.

Sieber, S.D. (1974) "Trends in Diffusion Research: Knowledge Utilization," Viewpoints, Bulletin of the School of Education, Indiana University, 50, 3:61-81.

The author discusses and critiques the major models and conceptual schemes for achieving knowledge utilization in education. He notes a number of points of confusion in the existing schematizations which tends to give an impression of competition among models of planned change. The author points out that very little is known about knowledge utilization from the viewpoint of the user. For this reason, he advocates a user oriented approach to knowledge utilization. According to the author, an example of such an approach is the Pilot State Dissemination Program. Based on the author's evaluation of this program he contends that enlightened educational reform at the local level depends upon three factors. The first is access to the national pool of research and other relevant information. Second is extension agents who are able to help clients determine their needs over time and to help them in using information addressed to these emerging and changing needs. Third is the opportunity for clients to define their own needs and to select from a variety of alternatives.

Sieber, Sam (1968) "Organizational Influences on Innovation Roles" In T.L. Eidell and J.M. Kitchell (eds.) Knowledge Production and Utilization in Educational Administration. Eugene, Oregon: Center for the Advanced Study of Educational Administration, University of Oregon.

The author identifies four features of the public education system which distinguish education from medical practice, industry and agriculture, and thus effect the applicability of diffusion research in these fields for education. The four distinguishing features of educational structures are: vulnerability to the social environment (adoption of innovation depends more upon political feasibility than educational value;) the professional self-image and associated values of educational personnel (the insecure professional self-image of teachers increases resistance to change and mitigates against communication of innovation); the diffuseness of educational goals (terminal goals of education and measurement of their attainment are difficult to specify); and the need for coordination and control of the primary clientele as well as of the employees of the system. The implications of these features for diffusion and innovation are discussed and suggestions are made for strategies of change. Three classical strategies for inducing educational change are identified and analyzed: the Rational Man Strategy (one-way communication is adequate); the Cooperator Strategy (involves participation of members of the system); and the Powerless Participant Strategy (assumes that practitioners are unable to make major changes in the educational structure). The author suggests that what is needed is a status occupant strategy of change which takes into account the distinctive characteristics of educational structures, and the conditions under which practitioners will respond to the tactics applied in each of the three traditional strategies. In addition, the author suggests that reorganization appears to be necessary at both the local and national levels.

Spooner-Smith, Laura, et.al. (1975) User Needs and the Development Process. Presented at the American Educational Research Association Annual Meeting (60th, Washington, D.C., March 31-April 4) 21 p.

An educational development team, working at the Center for the Study of Evaluation to produce the Elementary School Formative Evaluation Kit, saw that its mission was not simply to show that a product meets pre-determined performance specifications but was also to ensure that a product can be readily adapted by the user to the "noisy" conditions under which it ultimately will be used. People are likely to accept an innovation if it is consistent with their professional norms, levels of expertise, and day-to-day responsibilities. It is, therefore, the developer's function to devise a technology for solving a given problem that takes into account the "intentions and behaviors"of the target audience.

Spuck, D.W. (1974) "Reward Structures in the Public High School," Educational Administration Quarterly, 10, 1:18-34.

This article provides a literature reivew on taxonomies of incentives which induce cooperative behaviors from organizational members, with the concept of incentives or rewards being viewed as multidimensional in nature. The author then studies the relationship between eight categories of rewards available to teachers in high schools, and teacher behaviors of absenteeism, recruitment, and retention. The findings emphasize the importance of intrinsic motivators (those rewards the individual derives from the work itself) and suggest basic differences in motivational patterns between professional and production oriented organizations.

Stank, Peggy L. (1978) The Researcher: Working with Linking Agents to Bring Research to Schools. Presented at the Annual Meeting of the American Educational Research Association (62nd, Toronto, Ontario, Canada, March 27-31) 23 p.

The Interstate Project on Dissemination specified four components as critical for a successful state information dissemination system: linkage, information, incentive, and management. An analysis of Pennsylvania' system, using this project as a referent, uncovered several problems: 1) The linkage component was not functioning; 2) Local education agencies could not adequately identify needs; and 3) There were no linking agents in place. In response to this situation, the Pennsylvania School Improvement Program (PSIP) was developed, linking the state's Department of Education, two intermediate units and three research agencies with ten pilot schools. The research agencies are Research for Better Schools, Research and Information Services for Education, and the Learning Research and Development Center of the University of Pittsburgh. PSIP is built upon an intermediate unit linking agent who facilitates two-way communication between a local school and research outcomes and products. This linker is supported by staff from the research agencies and by a school-selected team. There are four major PSIP strategies: needs definition, knowledge consolidation, research outcome selection, and implementation. First year evaluations indicated that regular on-site involvement of the linking agent is essential to maintain the momentum of the PSIP process.

Steinhoff, Carl R. and Owens, Robert G. (1968) "Impact of Research Findings and Recommendations in Urban School Districts: A Case Analysis." Presented at the American Educational Research Association Meeting (Chicago, Illinois, February), 12 p.

A gap exists between educational research results and new educational programs. In the absence of either an increase in the supply of professional change agents to fill this gap or a proliferation of applied development centers, it is the researcher, or the professor, who must, along with teachers and administrators, utilize research to engineer solutions to educational problems. This case study shows that individual professors can be effective in helping to bridge the gap between research and practice.

Stephens, T. (1974) "Innovative Teaching Practices: Their Relation to System Norms and Rewards," Educational Administration Quarterly, 10, 1:35-43.

This study is a secondary analysis of data collected in 1966 during the Cooperative Project in Educational Development (COPED), a research and development enterprise involving several school systems and five universities.

Teacher behavior, in this case the use of innovative classroom practices, was examined with emphasis on its relation to norms (informal properties of a social system) and to rewards (formal properties of a social system) for innovative teaching.

The results underscore the importance of viewing individual behavior in its systemic context: innovations occurred where teachers saw them as rewarded, independent of individual dispositions toward such behavior. This suggests that increases in lateral communication will be an important element in any attempt to change teacher behavior.

Tyler, Ralph (1980) "Why Research is Needed in Education," UCLA Educator, Vol 21, No. 2, p. 4-9, Winter.

Calls for increased and systematic efforts in educational research to provide for meeting the new tasks of education. Enumerates five types of changing conditions that affect schools and colleges today. Emphasizes that educational development, evaluative research, and wide utilization of new knowledge are essential to the attainment of new educational objectives.

Tyler, Ralph W. (1978) "How Schools Utilize Educational Research and Development" In R. Glaser (ed.) Research and Development and School Change. Hillsdale, NJ: Erlbaum Associates.

Teachers and administrators do not generally report that they use the results of educational research in their work. One explanation for this is the cumulative nature of systematic knowledge, which means that much of what is used today was formulated in the past (e.g., Piaget and Thorndike). When new knowledge is incorporated into the practice of a teacher, he or she rarely is aware of the source and thus it is unlikely that the practitioner will appreciate the contribution that research has made to their work. The author suggests that two very common uses of research are: 1) in forming the conceptions that make up their cognitive maps and 2) in the generalizations that guide the conscious performance of their professional tasks. According to the author, it is unlikely that new knowledge will be incorporated into the practitioner's map unless they meet one or both criteria - "consistency"with the reality they perceive and/or providing guidance for more effective performance of their tasks. The author suggests that more attention should be given to the problems that practitioners face in trying something new.

Weick, K. (1976) "Educational Organizations as Loosely Coupled Systems," Administrative Science Quarterly, 21:1-19.

In contrast to the prevailing image that elements in organizations are coupled through dense, tight linkages, it is proposed that elements are often tied together loosely. Parts of some organizations are heavily rationalized but many parts also prove intractable to analysis through rational assumptions. It is this substantial unexplained reminder that is the focus of this paper. Loose coupling lowers the probability that the organizations will have to - or be able to - respond to each little change in the environment that occurs. Loose coupling may provide a sensitive sensing mechanism. A loosely coupled system may be a good system for localized adaptation. Since some of the most important elements in educational organizations are teachers, classrooms, principals, and so forth, it may be consequential that in a loosely coupled system there is more room available for self-determination by the actors. As a conclusion, this paper suggests some research priorities which constitute a reasonable approach to the examination of loosely coupled systems.

White, Brenda (1979) Research: What it Means for the Practitioner. Presented at the Annual Meeting of the Association for Educational Communications and Technology (New Orleans, LA, March) 14 p.

This paper explores ways in which practitioners can use research findings in their daily jobs - to keep up to date, to support program proposals, to substantiate budget requests, to improve selection of media, to evaluate services and communication, and to compare methods of instruction in the use of materials. Specific studies are reviewed and applications of findings are suggested. A bibliography is appended.

Willower, D.J. (1963) "Barriers to Change in Educational Organizations." Theory into Practice, 5, 1, 13-19.

In this article the author focuses on the organization rather than the individual, discussing some intra- and extra-organizational barriers to change in education, their sources and forms. Resistance to change develops: 1) from real or perceived threat that it poses to status; 2) if it promises to benefit one part of the organization at the expense of another; 3) when change is imposed from above; 4) when errors are made in introducing change.

Wolf, W.C., Jr. (1978) "Linking Knowledge Producers and Knowledge Users." 23 p.

Three different approaches to the problem of linking educational knowledge producers and knowledge users are studied in this paper. First, data are reported describing the knowledge generation and knowledge communication behavior of twelve successful innovators. Second, characteristics of twelve programs, conceived to train persons as change and/or linkage agents, are described in detail and then critiqued. And third, a ten-step dissemination methodology, designed to meet needs through the dissemination of products, is described. The paper summarizes what one might do - upon conceiving of a new practice, product, or idea - to determine the worth of the innovation and then to determine how best to inform others of its existence.

Wolf, W.C., Jr. and A. John Fiorino (1972) "A Study of Educational Knowledge Diffusion and Utilization." Massachusetts University, Amherst, Mass., 125 p.

Some six hundred educators were studied in depth to determine their experiences with innovation, the influences of recognized diffusion agents upon their adoption of innovations, the characteristics of selected target audiences in relation to the adoption of innovations to personal practice, and relationships between five distinguishable stages of innovation adoption described by rural sociologists and the adoption process described by randomly selected educators. Among the many findings of the study were that: most of the innovative activity was incidental to the operation and financing of the established order; most of the innovations discussed were drawn from outside the environ of the practitioner and used intact or after modifications; personel, direct involvement type diffusion strategies (colleague contact, workshops, institutes, courses) were more popular with innovative subjects. It was also found that innovators have more information sources and more cosmopolite sources of information than do non-innovators. The five-step pattern of innovation diffusion commonly seen in agriculture (awareness/interest/evaluation/trial/adoption) was found to be relatively applicable to the field of education.

Worth, Walter H. (1978) "Perspectives on Policy Formation," Canadian Journal of Higher Education, Vol 8, No. 2, pp. 1-7.

The relationships between policy formation and research is explored. Three theories accounting for the non-utilization of research, ways in which research is utilized by administrators, and situational factors influencing use are covered. Implications for future action within an increasingly political framework are presented.

Yin, R.K. and M.K. Gwaltney (1981) "Organizations Collaborating to Improve Educational Practice," Abt Associates, Inc. Prepared for the Research and Educational Practice Program, National Institute of Education.

This study was an investigation of knowledge utilization as an interorganizational process. This study specifically focused on one particular type of interorganizational arrangement - between local school districts and regional education agencies (REAs). The study intensively examined three REA arrangements which were selected because of their successful operation. The major focus of this research was on how these arrangements worked successfully to provide knowledge utilization services. Three types of services were examined: (1) staff development; (2) linker assistance; and (3) information retrieval. These three types of services represent the major knowledge utilization services that can exist between two collaborating organizations. The findings from the study indicate that the REA's and their member school districts had developed an active and satisfactory arrangement for the knowledge utilization process to the extent that they: (1) had access to external resources; (2) developed interpersonal networks; and (3) involved mutual exchanges and appropriate collaborative mandates. Because the findings are based on three case studies, the authors point to the need for further corroboratory research.

Zaltman, G., Florio, D., and L. Sikorski (1977) Dynamic Educational Change. NY: Free Press.

This book is a sourcebook for planning and managing changes within schools and school districts. It presents an integrated conceptual framework for change and specific guidelines for implementing changes and solving problems that often confront organizational innovators. The book begins with a discussion of the nature of change in education with special emphasis on how schools are different from most other types of complex organizations. Based on current models and strategies for change, the authors propose the "Proactive/Interactive Change Model" (P/ICM) as a means to facilitate understanding of the stages in the innovation process. The basic purposes of this book are summarized as follows:

1) to provide guidelines for initiating and sustaining change in a broad range of educational settings
2) to help build a capacity for self-renewal in educational organizations
3) to serve as a primer on the management of educational change for the student of educational administration
4) to provide a structure within which much of the literature on educational change can be viewed
5) to introduce the reader to the best and most relevant work on change outside the field of education
6) to present an eclectic model of change.

III CONTEXTS FOR CONDUCTING FIELD RESEARCH ON KNOWLEDGE USE AND SCHOOL IMPROVEMENT

Evelyn Fisher

Problem Specification
Past Efforts to Alleviate this Problem
  --Consultants Assuming Internal Roles
  --Products as Media of Knowledge Introduction
  --Knowledge Introduced Through Collaborative Planned Change Effects
  --Other Approaches to Knowledge Use Studies
Events Sampling
Phase Sampling
Stakeholder Sampling
Combining Event, Phase and Stakeholders Sampling

ABSTRACT

The purpose of this paper is to outline and justify an approach that permits investigators to sample and study key "events," "phases" and "stakeholders" as a means to overcoming the problem of identifying occasions of knowledge use for study or biasing the research by concentrating on a single change attempt.

A major problem in studying knowledge use in school policymaking and practice for school improvement has been the elusive nature of many of the occasions of knowledge use. Individuals within a school district are continually being exposed to or seeking knowledge which may influence their own perceptions, definitions of situations and practices. Indeed, the emphasis on continuing education, credentialling and salary increments for graduate credits earned by professionals is intended to encourage individuals to acquire knowledge for use. Measuring the change in knowledge made accessible, possibly used and integrated with experiential knowledge and knowledge-in-use by individuals is extremely difficult. Any significant impact on the system as a whole is unlikely to occur, however, unless the knowledge claims that the individual encounters are shared with others in some formal manner. Our concern is therefore limited to situations in which knowledge claims are put forth and transacted in a collective setting. The introduction of knowledge by any individual within the system becomes one possible instigation of a collective knowledge transaction.

Even if the phenomena for study are restricted to knowledge transactions and use that potentially affect collective learning capacities, identifying occasions for empirical research requires careful consideration.

This working paper (1) specifies this problem of identifying occasions of knowledge use for research; (2) reviews and evaluates past research efforts to alleviate it; and (3) outlines and justifies an approach that permits investigators to sample and study key "events," "phases" and "stakeholders."

1) Problem Specification

Researchers cannot themselves become aware of all of the possible instances in which knowledge enters an on-going system of actors and activities. If the researchers intend to study various situations of knowledge use they must have the assistance of persons within the system of action to alert them to events that may be studied. Yet in order to provide this notification, even the most cooperative and conscientious informants require criteria for defining a situation as constituting an instance that provides a potential opportunity for studying knowledge use. While the concern is with collective knowledge transacting with symbolically mediated and publicly shared meanings, there must be a medium or channel that introduces knowledge in some form or a situation calling forth knowledge claims that produces an occasion for discussion among members of a collectivity. This means then that by the time that even the most sensitive observer is aware that knowledge transacting is occurring, there will be a prehistory as well as possibly consequences that may be studied.

From an analytic perspective, the introduction of knowledge, the putting forth and contesting of knowledge claims that occur and the consequences which may ensue may be treated as an entity. This has characterized most case studies of knowledge use or school change. It must be recognized, however, that this is an imposition of entitivity and is not necessarily experienced as such by the actors involved. For the actors, these occurrences are part of the natural flow of activities of daily life in a school district. The process that the researcher goes through of selecting specific interactions and actions may be likened to writing a play in which the author truncates time elapsing between significant events and eliminates the extraneous happenings that would be assumed to occur in the natural course of everyday life but would not influence the theme's development. So the researcher selects from the myriad of social interactions and actions that do go on those that are thematically linked to the problem as defined by the researcher. These may be observed and documented, or reconstructed. They are analyzed with the use of concepts, constructs and research techniques to explicate the knowledge use related processes and influences on these processes.

The problem, then, is to become aware when knowledge entering into the system of on-going activities is put forth or subjected to collective transactions which could potentially affect the system itself or some component of the activities or practices that are engaged in.

2) Past Efforts To Alleviate This Problem

In reviewing past research on knowledge use to effect improvement in educational practices, it becomes evident that many of the studies were restricted to purposive interventions into an on-going system by outside agents or agencies. The problem of identifying situations or occasions of knowledge use was thus handled by limiting the range of studies to known attempts to introduce change into the system. Relatively little attention was given to occasions instigated by persons within the system or those influenced by other systems as, for example, the legal system, except as these constituted impingements on the course of events under study. In some instances these were considered as "derailing" intentions or even causing attempts at planned change to be aborted.

The research literature is rather heavily biased toward an imagery of schools as conservative environments in which the organizational climate or structure and the practices are in need of change. The research then focuses attention on attempts to effect change. There have been numerous approaches to and strategies for attempting to alter school practices. The emphasis has been on developing models, strategies, principles of change so that knowledge can be introduced into a system and the practitioners encouraged to use it. The implication is necessarily that the knowledge-in-use within an existing system of practices is deficient and needs to be altered or replaced by some knowledge produced elsewhere and available for adoption. Although our own program of research will take a significant departure from this research, the cumulated literature can be interrogated with respect to how the problem of knowledge use has been defined and subjected to study.

In conducting this review, a classification schema has been developed in order to impose some order. It should be understood as a means to creating order rather than description of sequential developments. Even though some planned change action systems evolved as attempts to improve upon previous ones and some research on these action systems have responded to new problem formulations and systematic attention to newly explicated issues and concerns, there was not a unilarity in the efforts that ex post facto analyses may seem to impose.

(a) Consultants Assuming Internal Roles

Knowledge has often been introduced into a system by external consultants. These were often faculty members from institutes of higher education working with school districts to effect improvement. These consultants either had preestablished plans regarding desired changes and strategies for effecting them or they went into the system to identify problems and tap their knowledge and expertise for resolving them. In either case, the consultants or change agents became the medium through which knowledge was introduced. They temporarily took on leadership positions in which they identified or formulated the problems, decided what strategies or changes could be introduced to solve them and tapped their own knowledge and expertise. Once they had effected the changes by getting people to change their practices or procedures, it was assumed that the regular participants in the system would sustain the changes that had been made. The consultants then left the district. Frequently books, reports or papers were written by these persons retrospectively in which they reflected on their successes or the obstacles and impediments to knowledge use of social change that they encountered.

Characteristic of external change agents who attended to strategies for entering a system and contacting classes or categories of role incumbents in order to effect change is the work of Fantini and Weinstein (1966). Their self study focuses attention on strategies they used for involving or coopting strategic groups in order to create change in the complex bureaucracy of schooling. These authors were striving to develop a model for how to effect change in school districts that could be used by other external consultants. This approach did not increase the capacities within districts to identify needs and effect their own improvements but rather created at least temporary dependencies on these external consultants who had assumed a leadership function. Experience with this approach often later revealed that once the external change agents left the system, the changes were not necessarily sustained. This seemed to be particularly the case if dissatisfactions or difficulties were encountered with the "new way of doing things." Since the consultants were no longer available to turn to for help and the social support system or personal incentives were lacking for solving any problems, it seems that old practices were reinstated (Pincus, 19).

Numerous studies concentrated on how to bring about organizational change (Baldridge and Deal, 1975). Although some of these change attempts involved, at least in part, the introduction of curricular change or instructional innovations, the focus remained at the level of "inducing change." Involvement by actors within the system was attended to at the level of participation, not at the level of the cognitive processes such as comprehension, assessment or knowledge use. Research publications usually did not give details of the changes themselves or the knowledge bases but focused attention on the "degree of implementation" or "obstacles to change" (Gross, Giacquinta and Bernstein, 1971).

(b) Products as Media of Knowledge Introduction

During the 1960's, there was a widely held view that educational outcomes could be improved if the theories and research findings from the behavioral and social sciences were applied to educational practices (Cronback and Suppe, 1969; Derschimer, 1976). With the establishment of federally-supported research and development centers and regional laboratories, an emphasis was placed on developing innovative programs that could be disseminated to potential users. Concomitant educational programs such as Head Start, Follow Through, Right to Read, etc. encouraged the adoption of educational innovations. Competing with, though not completely replacing, the single or small group of consultants as mediators of change approach was this concept of "packageable products."

Even when innovations were developed in collaboration with school personnel from one district or single school, the expectation was that there would be a "finished product" that would be appropriate for use in other schools. The instructional technology was often developed initially within the context of the research and development organization and used the findings of research on learning and learning environments conducted from a psychological perspective (Glaser and Resnick, 1972). This knowledge was integrated or synthesized with craft and experiential knowledge in the development of innovative programs. The program was tried out experimentally in a school and formatively evaluated and revised as necessary (Bickel, 1978).

Further dissemination and assistance with implementation became tasks for others once the product was considered to be completed by the developers, although developers sometimes served as consultants. This led to an elaborated division of labor. It was the basis for the establishment of federally-funded regional laboratories whose tasks were to help schools in their region select and implement appropriate educational innovations. This initial plan was soon modified for a number of reasons. Some of the innovations were so complex that once a laboratory staff had developed strategies and training programs for helping school district personnel with the introduction of the innovation, it seemed more efficient to "specialize" in that innovation nationally wherever it was adopted. A second reason was that there were insufficient "completed products" to select from among that were appropriate for schools in the region. A third was that many innovations were perceived by the laboratory staff as incomplete or in need of modifications as they introduced them into schools. Many regional laboratories became involved in their own development activities. In addition to those who designed and developed innovations, there were those who designed and developed systems for disseminating information on available innovations (see, for example, Radnor, et al, 1976), linking systems with change agents or change agencies (see, for example, Havelock, 1969) and storage and retrieval systems such as ERIC at the national level or RISE in Pennsylvania at the state level. Those researchers concerned with knowledge use in systems of practice studied the functions fulfilled by these systems, developed models of knowledge production and use systems, studied the roles involved (Havelock and Havelock, 1973) in order to train role encumbents or conducted research on the use and users of these systems (Sieber, 1968; Sieber, et al, 1972).

It was generally assumed that if educational innovations were adopted for use, the scientific knowledge used by the developer was itself then being used. It was also assumed that innovations that were adopted were being used and therefore student outcomes were an evaluative measure of the innovation itself. Evaluations of change efforts became broadly mandated. Fullan and Pomfret (1977) pointed out the lack of attention to what happened between innovation adoption and outcome evaluation. Other researchers began to focus on this issue and tried to determine the degree to which an innovation was being implemented (Leinhardt, 1977). This required that what went on in classrooms be compared with what the developer had intended although these intentions were not always made explicit. Since there can be an almost infinite amount of variation in what occurs in a classroom at the concrete level, attempts were made to measure classroom processes and to relate these to outcome measures (Cooley and Leinhardt, 1975). This research did not address the issue of how this variation among users came about, nor indeed how the classroom processes were influenced by the innovation.

Because knowledge use was still being equated with innovation use, the direction of research was toward "implementation." Many of these innovations were comprehensive instructional programs that not only included curricular materials but pedogogical strategies and techniques, recommended management and achievement monitoring systems and practices for the teacher which often required redefinitions of the role of the teacher. Some research focused on organizational variables in an attempt to explain implementation variation. This was particularly the case with large scale surveys. The extensive Rand study on implementation included both surveys and case studies. The latter revealed variation in use of the same innovation. Greenwood, Mann and McLaughlin (1975) offered the explanation that users "adapted" innovations to accommodate the particular characteristics of their school of classroom. This implied that users had a conception of how an innovation was intended for use, knowledge of their classroom or school and what would have to be altered or adapted in order to make the innovation suit that particular setting. In the process, mutual adaptation resulted in which both existing practices and existing innovations were altered. Fisher, Penoi and Wesley (1979) found no evidence that such tailoring to the situation of use was occurring since variations among classrooms were just as great as the variation among schools serving different areas of the district. They suggested that teachers as users had differing intentions and expectations so that they actually imputed different meaning and potential to the innovation's components or management system. Magoon (1977) in a conceptual paper supported this constructivist explanation for variation in the use of innovations.

None of these studies on the use of innovations dealt with the phenomena and processes at the level of knowledge claims. The developers of innovations presumably assessed scientific knowledge claims but their "products" reflected a great many decisions in which scientific knowledge claims, experiential knowledge and craft knowledge were interwoven. The practitioners used the innovation. While conducting preservice workshops consultants in introducing the innovation often gave rationales for the components or the management system in addition to instructions on how to use the program materials. Even when the rationales were not questioned or challenged by teachers, teachers seemed to impute their own, sometimes conflicting, meaning to them. For example, it was frequently found that curricular components that allowed students to practice skills in a game format or that relaxed the imposed structure to allow children to explore were defined by many teachers as "play." "Play" was a privilege that could be earned or an opportunity that could be denied as a disciplinary measure. These activities were not treated as an integral part of a learning environment. These seemed to be no indication that teachers were deliberately misusing an innovation but rather that they imputed different meanings to the components of the innovative program and used them accordingly. Other qualitative research concerned with the use of innovations recognized the subjective meanings and attitudes (Hall, _et al_, 1975; Hall, _et al_, 1979).

(c) Knowledge Introduced Through Collaborative Planned Change Efforts

Some attempts at improvement in practices have involved a collaborative effort in which school personnel and external consultants have identified problems or needs and planned changes. These have differed from the cases where the external consultant took over the leadership role. While these opportunities to study knowledge use could readily be identified, since consultants were entering a school district, the resulting literature has focused on explicating "principles of change" or "strategies of change" (Rothman, 19/4; Zaltman and Duncan, 1977). These have provided prescriptive guidelines for how to effect change distilled from the experiences of the persons who have served in a consulting role or comparative research on planned change efforts.

(d) Other Approaches to Knowledge Use Studies

There are three additional types of studies that have been conducted that have not been restricted in their focus to specific intentional efforts from outside agents or agencies. The first type may be classified as diffusion studies (Rogers, 1962; Rogers and Shoemaker, 1971) where the interest has been on the adoption of ideas or innovations. The difficulty encountered in studying knowledge use processes in cases of diffusion of knowledge is that they were rarely studied concomitantly but relied heavily on reconstructions by the participants or inferences made by the researcher.

A second type attempted to identify knowledge changes that have occurred over time as a result of widespread acceptance of scientific knowledge such that it became part of the diffuse culture. Getzels (1978), for example, suggested that the physical arrangement of classrooms in various eras reflected different perceptions of the learner and the learning process. Although this does not provide insights into the knowledge use processes, it does call attention to the diffuse culture which may influence knowledge-in-use or the more global reality constructions within which knowledge-related events are experienced and knowledge claims assessed.

The third category focuses attention on knowledge-in-use rather than specifically on new knowledge entering into systems of practice. These studies are usually qualitative, and attend to the ways in which people make sense of their everyday life situations.

2) The Knowledge Use Approach to School Change

These solutions to identifying occasions of knowledge use that are reflected in the literature are too limiting for our purposes. They either concentrate on a single, deliberate attempt to change school practices, some specific sector or characteristics of an information flow system or on knowledge-in-use. While these studies have made contributions to our understanding of schools and attempts to improve school practices, they have not adequately captured the school as a functioning community of practitioners into which knowledge claims are introduced, assessed and used.

EVENTS SAMPLING

It is our intention to begin with the school district as a formally organized, knowledge using community of practice. Our concern is with knowledge claims that may be introduced or situations that may occur that instigate the putting forth and contesting of knowledge claims. The events which precipitate collective knowledge transacting may vary condiderably. In order to study knowledge use processes and issues that may affect practices, we do not want to limit research to any particular change attempt but rather to sample the variety of events that do occur.

Although events that do occur must be classified in order to select those that differ maximally according to some criteria, it is necessary to generate a schema in advance as a guideline for informants. This schema is meant as a sensitizing heuristic and not as an exhaustive framework of all logical possibilities.

EVENT GENERATED FROM WITHIN

^{A}PRECIPITATING CONDITIONS	^{B}INSTIGATOR	^{C}COMMUNICATIVE MODE
(1) Problem Identification		
(2) Need Assessment		
(3) Alternative Envisioned		
(4) Situation Altered or Redefined		

TABLE I

Discussion of categories:

A-(1) An event that precipitates collective knowledge transacting may be the identification and articulation of a problem as defined by an individual or group within the system.

B-(1) The definition of some situation or condition as problematic may be articulated by an individual in a position of authority and responsibility who can impose that definition as a basis for problem-solving action.

The definition of some situation or condition as problematic may be articulated by an individual in a position of responsibility for some subset of tasks where problem-solving activity may require sanctioning and/or cooperation by others.

The definition of some situation or condition as problematic may be articulated by a subset of persons who share similar sets of tasks and responsibilities.

A-(2) An event that precipitates collective knowledge transacting may be the assessment of a need that is unfulfilled or inadequately fulfilled.

B-(2) The need may pertain to the system as a whole and be assessed by an individual from the perspective.

The need may pertain to a sub-category of tasks or subgroup of actors and be assessed by an individual or individuals from the perspective of the sub-category.

The need may pertain to a sub-category of tasks or subgroup of actors and be assessed by an individual or individuals from the perspective of within the system but outside the subgroup.

A-(3) An alternative way of accomplishing some tasks or attaining some desired outcomes may be envisioned and precipitate collective knowledge transacting.

B-(3) An alternative way of more adequately, effectively or efficiently accomplishing a desired outcome or improving a situation or condition may be envisioned by an individual in a position of authority to mandate change.

An alternative way of more adequately, effectively or efficiently accomplishing a desired outcome or improving a situation or condition may be envisioned by an individual in a position of responsibility for the efforts of others in some task domain who recommends change.

An alternative way of more adequately, effectively or efficiently accomplishing a desired outcome or improving a situation or condition may be envisioned by an individual who requests the sanctioning or support of others to effect change.

A-(4) A situation which is altered or redefined may precipitate knowledge transacting in order to accommodate existing practices to this change.

The definition of a situation as having changed or in the process of changing may be put forth by any individual or collectivity.

C The communicative mode may be a written directive, an in-service workshop, meeting, formation of a task force or committee.

EVENT GENERATED FROM OUTSIDE

	(A) AUTHORITATIVE	(B) ADVOCATIVE	(C) FACILITATIVE
(1) FEDERAL	Law Legal Decision Regulatory Mandate	Federal aid for Proposed Projects Within Policy Guidelines	Federal aid to Meet a Need
(2) STATE	Law Legal Decision Regulatory Mandate	State aid for Proposed Project Within Policy Guidelines	Technical Assistance and Training
(3) LOCAL	School Board Decision	Demonstrations	In-service Workshops
(4) OTHER	Union Contract	Political Interest Groups Commercial Agents	Technical Assistance Commercial Training

TABLE II

(1) A - Events initiated outside the school district may impact on the district instigating collective knowledge transacting to accommodate practices to requirements binding on the district. The passage of federal law or a legal decision establishing action in conformity with interpretation of a law may be such an event. Federal policy mandates affecting current practices may be another such event.

B - Announcement of or change in federally-funded or aided programs for qualified or approved projects may be an event instigating knowledge transactions within a school district. These are advocative rather than authoritative since districts need not apply for federal program participation.

C - Federal aid to facilitate a district's meeting of a need (such as compensatory education) may be an event that precipitates knowledge transacting.

(2) A - Changes in laws, legal decisions or regulatory mandates issued from the state may be events that instigate knowledge transacting since school districts are required to comply.

B - The state may provide financial aid to school districts to assist them in undertaking some advocated activity. This may instigate knowledge transacting.

C - The state may provide technical assistance and training in order to promote some particular practices.

(3) A - A School Board decision may be an event that initiates knowledge transacting as decisions are translated into action plans.

B - Demonstrations of how other schools or classrooms are operating may instigate knowledge transacting.

C - Inservice workshops with consultants from outside the district may be an event instigating collective knowledge transactions.

(4) A - Union contracts, their formulation, negotiation and implementation may be events that instigate knowledge transactions.

B - Political Interest Groups may bring pressure on school districts to add or alter practices. These may lead to collective knowledge transactions.
Commercial agents may attempt to sell a product and this may instigate collective knowledge transacting.

C - Technical assistance provided by persons outside the school district in the public or private sector may facilitate or instigate collective knowledge transacting.

PHASE SAMPLING

At any time that research is conducted to explicate respondents' assessments or use of knowledge associated with any event, different phases may be occurring. Tentatively such phases may be considered exposure to knowledge claim, assessment of knowledge claim as a collective transaction, integration of knowledge with knowledge-in-use, reinforcement or reconsideration of knowledge claim, use or rejection of knowledge claim or institutionalization of knowledge at which point it has become knowledge-in-use. Although some empirical research by Hall, et al (1975) has led to categories of "levels of use," little research has attended to the influences on these processes, or what causes variation within a community of practitioners. By combining the sampling of phases with network mapping and multiattribute analysis, a more precise explanation can be generated.

STAKEHOLDER SAMPLING

Individuals as subgroups may have different knowledge-in-use, frames of reference, different assumptions or definitions of situations that influence their problem structuring, assessment and use of knowledge. In order to ensure that a balanced range of possible knowledge transactions and assessments are included in a study of knowledge use within a school district, it is critical to use a sample of stakeholders that will maximize differences.

A general list of stakeholders in education can be generated to include categories of persons in particular role relationships to the system. These would include categories such as teachers, students, various administrative personnel, school board members, union representatives, parents. To some extent the sampling would have to be related to the events being used since not all events would affect all stakeholders directly enough for them to be informed. It is also the case that events may be very differently perceived, defined and reacted to by members of any single stakeholder group. For this reason, sampling would involve representation of stakeholder groups and within each category, sampling of persons with differences that are known among the stakeholder group or others as a first approximation to maximizing differences. It is a first approximation because it is limited to publicly shared differences. As the research reveals bases for these differences, more refined sampling can be undertaken to reflect the dimensions of differentiation.

Combining Event, Phase and Stakeholder Sampling

By combining these three types of sampling research can be conducted in a more rigorous, focused and less obtrusive manner than the traditional case or field study. The sampling strategies allow a wide range of differences to be captured with minimal intrusion into the activities and schedules of participants. These differences may be with respect to events, to phases or to stakeholder frames of reference and meaning structures, all of which will be reflected in the selection of persons as participants in the research. Repeated rounds of interviews and instrument administration will permit the traces and bases of any changes to be explicated.

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IV QUALITATIVE PROCEDURES FOR RESEARCH ON KNOWLEDGE USE AND SCHOOL IMPROVEMENT

Thomas McIntyre and Evelyn Fisher

- Qualitative Research
  - --Selected Theoretical Perspectives
  - --Selected Methodological Techniques
- Qualitative Research in Knowledge Use and School Improvement
  - --The "Everyday" Character of Knowledge Production and Use
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ABSTRACT

The purpose of this paper is to critically review the theoretical perspectives and methodological techniques of qualitative research. The past use and applicability of qualitative procedures to knowledge use and school improvement is explored.

I. Qualitative Research

The term "qualitative research" is itself an amalgam, designating a variety of both theoretical perspectives and methodological techniques. Among the former are included phenomenological sociology, existential sociology, cognitive sociology, reality construction, symbolic interactionism, and ethnomethodology. Qualitative methodological procedures include such common techniques as participant observation and ethnography, interviews, life histories, and the use of assorted unobtrusive measures as well as more uncommon techniques particularly associated with ethnomethodology such as breaching.

Yet while qualitative sociology is marked by such diversity in theoretical perspective and methodological procedure, it does have a central animus comprised of distinct goals and assumptions which serves as a point of coalescence. Qualitative sociology takes as its object the reality of everyday life which is regarded as an actively constructed product of human agency. The order inhering in such reality is not regarded as independent of the actors' purposes, intentions or motives. Rather, order emergent in social interaction processes is taken to be the product of meaningful human activity. That is to say that actors impute meaning to their own and to others' actions and that such meanings are the sine qua non of social action. As Douglas (1970:ix) notes, "the 'forces' that move human beings, as human beings rather than simply as human bodies...are 'meaningful stuff.' They are internal ideas, feelings, and motives."

It follows then that to understand social action and the reality constructed by the meaningful activity of associated actors one has to go directly to the actor, to understand behavior from the actor's point of view - that is interpretive understanding or what Max Weber called "verstehen." To this end "qualitative" methods yield generally descriptive data that enable the researcher to see the world as subjects see it (Bogdan and Taylor, 1975:2).

This review of elements of qualitative sociology's central animus has been intentionally kept brief so that it might simply serve as an introduction to the more specific treatment of theoretical perspectives and methodological techniques which follows. For a fuller discussion of qualitative sociology with an emphasis on both theoretical and methodological issues see especially Bogdan and Taylor (1975), Cicourel (1964 and 1968), Denzin (1970 and 1970a), and Schwartz and Jacobs (1979).

A. Selected Theoretical Perspectives

Chief among the theoretical perspectives comprising qualitative sociology is the phenomenological perspective based upon the phenomenological philosophies of Alfred Schutz and Edmund Husserl, and the earlier verstehen sociology of Max Weber. Phenomenological inquiry seeks to get at the things themselves, that is to see the phenomena as directly as possible or as they are presented in immediate experience. Since the knowing subject always experiences things first hand a person as such a subject and also as a sociological observer has the opportunity to directly examine that experience.

Consistent with Husserl, phenomenologists distinquish between the natural and the theoretic stance taken toward the everyday life world. The natural stance:

> ...is the stance in which the everyday world is taken for granted as it is experienced in everyday life...It is a stance that does not raise serious questions concerning the nature of the everyday experience but, instead, takes that experience as a fact (Douglas, 1970:14).

In contrast, the theoretic stance toward the everyday world involves standing apart from and reflecting upon the experience taken for granted in the natural stance. The theoretic stance emerges from a particular activity of the observing subject which Husserl referred to as phenomenological suspension or "epoche." Employing this procedure, the phenomenological observer/researcher "brackets" the assumptions which structure the experience of actors in their everyday life worlds. In this way a clearer vision of everyday life emerges from a fuller examination of the myriad of elements constituting everyday experience. As Psathas (1973:15) observes:

> ...in a phenomenological approach, a whole range of experiences that would ordinarily be ruled out are instead, as objects of intentional consciousness, entitled to the same serious attention and study. Thus bracketing enables one to expand his view and embrace more aspects of the world for study.

Finally it is important to note that commitment by phenomenological researchers to the theoretic stance results in certain methodological implications. The phenomena of everyday life must be studied on their own terms and only those methods of observation and analytic modes that retain the integrity of the phenomena should be employed (Douglas, 1970:16).

A related theoretical perspective associated with qualitative sociology is symbolic interactionism which traces its roots to the works of John Dewey, Charles Horton Cooley, Robert E. Park, W.I. Thomas, and George Herbert Mead. Central to symbolic interactionism is the notion of the actor's imposition of meaning upon the action situations in which he or she is implicated in the form of interpretations and definitions of elements in those action situations. Thus situations are rendered meaningful only as the result of the active agency of human actors. In situated interaction processes actors develop definitions of the situation in concert with other actors engaged therein and they act in terms of these definitions. Order inhering in interaction processes is taken to be an emergent property of the interaction arising out of the negotiation of convergent definitions of the situation by associated actors.

A most succinct statement on the character of symbolic interactionism is provided by one of its most influential contemporary proponents, Herbert Blumer (1956:686):

> We can...look upon human life as chiefly a vast interpretative process in which people, singly and collectively, guide themselves by defining the objects, events, and situations which they encounter...And scheme designed to analyze human group life in its general character has to fit this process of interpretation.

As is the case for all theoretical perspectives, distinct methodological considerations follow upon the use of the symbolic interactionist approach. As Denzin (1970) suggests, at least two methodological principles may be identified. In the first place, an adequate investigation from the point of view of the symbolic interactionist perspective requires that both symbols and interaction be addressed. "To focus only on symbols...fails to record the emergent and novel relationships these symbols have with observable behavior" (Denzin, 1970:7-8). Secondly, the investigator must attend to shifting self-definitions in interaction processes. He must take the role of the other whom he is studying in order to assess the meaning the situation has for the actor from his or her own point of view.

A third and more recently articulated theoretical perspective associated with qualitative sociology is ethnomethodology. Numbered among its most influential proponents are Harold Garfinkel, Jack Douglas, Egon Bittner, Don Zimmerman, and D. Lawrence Wieder. The term "ethnomethodology" itself does not refer to methods as such but rather to the object of inquiry. That object of inquiry is the practical ways, procedures, or methods by which people order their everyday life situations. The task of the ethnomethodologist "...is to examine the ways people apply abstract rules and commonsense understandings in situations in order to make actions appear routine, explicable, and unambiguous" (Bogdan and Taylor, 1975:16). These understandings or meanings are taken to be practical accomplishments of the actors. Likewise, as Garfinkel (1967:viii) suggests, ethnomethodology has as its aim the analysis of "...the formal properties of common sense activities as a practical organizational accomplishment."

Among the formal properties of the common sense activities of everyday life of greatest interest to the ethnomethodologist are reflexivity, intentionality, and indexicality. In analyzing what Garfinkel calls the "reflexivities of accounts" he notes that actors' accounts of reality and its workings are constituent parts of that reality they describe. This is the central point which emerges in ethnomethodological studies of conversations as verbal accounts in the works of Cicourel and Sacks and of written records in organizational settings such as social welfare agencies (Zimmerman, 1970), juvenile probation agencies (Cicourel, 1968), and mental health clinics (Garfinkel, 1967).

A related property is that of intentionality of thought and action which has its origins in Schutz's principle that interests organize our constructs in the common sense world (Heeren, 1970:45). As Douglas (1970:26) notes, "information and ideas become conscious as we see them as useful to the attainment of our purposes at hand."

Indexicality refers to the fact that rules, accounts, or other meaningful components of practical activities can be understood only contextually. That is to say that their meaning is contingent upon the broader context in which they occur. For example rules in organizations can only be understood as "...practical problems that themselves arise out of the association of those people, facing those problems, in those periods of time" (Manning, 1970:242; see also Garfinkel, 1967: chap. 1; and, Bar Hillel, 1954).

Methodologically, the ethnomethodological perspective has become associated with the use of a number of uncommon techniques, purposefully highly obtrusive in character, involving the breaking of rules of everyday life in interaction situations to render them conscious and thereby analyzable. For a review of these techniques see Garfinkel (1967), Mehan and Wood (1975), and Schwartz and Jacobs (1979).

Together then these three dominant theoretical perspectives of qualitative sociology signal the emergence of interest in the reality of everyday practical activity. A reality dynamically constructed by the creative agency of the human actor, and a reality which requires, as a condition of its illumination, the use by sociological investigators of particular methodolgical procedures pertinent to it.

B. Selected Methodological Techniques

Any methodology may be characterized by the particular type of data which it produces. Qualitative methodologies produce descriptive data in the form of subjects' spoken or written words and observable behavior. According to Patton (1980:22) qualitative methods generate raw data from the empirical world consisting of:

> detailed descriptions of situations, events, people, interactions, and observed behaviors; direct quotations from people about their experiences, attitudes, beliefs, and thoughts; and excerpts or entire passages from documents, correspondence, records, and case histories.

Unlike data generated through conventional quantitative procedures, qualitative data are marked by two distinguishing features, depth and detail. These two features serve as the intrinsic source of value of qualitative data. Additionally, as compared to more conventional quantitative procedures, qualitative procedures have a more "ad hoc" quality. This is not to say that qualitative researchers are more haphazard in formulating or carrying out such procedures relative to their quantitative counterparts. Rather, they are simply acutely aware of the tremendous variety and diversity of concrete action phenomena and they let the problem situation determine the method. Indeed, among qualitative researchers this procedural guideline is elevated to a cardinal tenet. Mills (1959:224) states the case thusly: "Avoid fetishism of method and technique...let every man be his own methodologist." Methodological orthodoxy is thus considered anathema to "good" qualitative research. And qualitative researchers are much freer to innovate, to experiment, to devise de novo techniques with which to uncover the often seemingly recalcitrant reality of everyday life.

Thus the assessment of qualitative procedures is inherently fraught with problems given these considerations and such an assessment can never lay claim to exhaustiveness as a quality. Yet as a way of proceeding perhaps it would be nonetheless appropriate to very briefly review more conventional qualitative techniques in an attempt to sensitize the reader to problems associated with qualitative research generally.

Chief among the more conventional qualitative techniques frequently employed in social research efforts is participant observation which represents a commitment on the part of the investigator to intimately participate in the experiences of the subjects under study. Participant observation is particularly suited to permit the investigator to experience the world of his/her subjects from their point of view. Properly conceived, participant observation entails the simultaneous use of multiple methods, becoming a "triangulated methodology" (Denzin, 1970a:366). The participant observer collects and analyzes documents, conducts interviews with informants and participates directly in subjects' activities.

Participant observation may assume a variety of forms depending upon the particular role taken by the investigator. Building upon the earlier work of Junker (1952), Gold (in Denzin, 1970a: 370-380) has developed a four-fold typology of observation roles to include: complete participation, participant-as-observer, observer-as-participant, and complete observer. Complete participation characterizes the activity of the covert participant observer who never reveals his/her identity to the subjects under study. He/she assumes the role of member. The participant-as-observer represents the most commonly used observational method or overt participant observation where the researcher makes his/her identity known but attempts to "normally" participate in subjects' activities. The observer-as-participant role is best represented in surveys where the interviewer may see his/her respondents only once in a brief encounter. Finally, the complete observer is best seen in the experiment where the observer does not participate at all in the events being studied.

A distinct set of problems is associated with each of these observational roles. For these see: in Denzin, 1970a: Orne, Leik, Riecken, and Olesen and Whittaker; and, Polsky (1967), and Schwartz and Schwartz (1955). But for here suffice it to say that as one approaches the role of complete participant, avoidance of "going native" or problems of maintaining objectivity are exacerbated while, as one approaches the role of complete observer, descriptive detail of data and deeper theoretical insight are forsaken.

For an excellent treatment of participant observation see: Berreman, 1962; Bruyn, 1966; McCall and Simmons, 1969; Adams and Preiss, 1960; Schatzman and Strauss, 1973; and many of the essays in Becker, 1970.

A second commonly employed qualitative procedure which is the most basic source of sociological data is the interview which is simply a face-to-face conversational exchange in which one person elicits information from another. There are different types of interviews ranging from highly structured to highly unstructured. A structured interview consists of a single set of similarly ordered questions given to all sample respondents. Structured interviews result in the elicitation of common information from all respondents which enhances coding capabilities yet it assumes uniform understanding of questions by all respondents. Such an assumption is often unfounded (Benney and Hughes in Denzin, 1970a:190-198). The structured interview is best suited to hypothesis testing and rigorous qualification of results (Maccoby and Maccoby, 1954).

The unstructured interview employs neither fixed questions nor a predetermined order for asking them. This method is more fluid and is best suited for probing subjects' ill-defined attitudes or in situations where a diversity of opinions is prevalent. Problems associated with unstructured interviewing include difficulty in coding and lower degrees of replicability. This type is best suited for exploratory studies (Maccoby and Maccoby, 1954).

Generally interviewing is a good source of data on subjects' perspectives or views on particular topics but it suffers from a number of problems peculiar to it as a type of communicative interactional encounter. The encounter is productive of a number of emergent properties, each of which may jeopardize the validity of the information revealed. Tone of voice, dress, mood, vocabulary, a variety of status differentials, length of interview - all of these features impact upon interview interactants, determining the meanings interactants attach to the situation as well as to the information transmitted and received therein. According to Denzin (1970:132-141), sources of invalidity in the interview because of its peculiar character as a communicative encounter include the following: lack of consensus surrounding interviewer and interviewee roles, variations in the presentation of self, and divergent interpretations of interactional rules.

For all of these reasons, it is believed that interviewing could be most effectively employed when combined with other procedures so that the many problems associated with it may be mitigated. Among the best works on interviewing are the following: Hyman, 1954; Richardson et. al., 1965; Garden, 1969; Denzin, 1970 and 1970a; and, Bogdan and Taylor, 1975.

A third technique commonly associated with qualitative methodology although much less frequently employed than observation and interviews is the life history method. According to Denzin (1970a:415-416) the life history method involves the formulation of explanations:

> that reflect one person's or one group's subjective experiences toward a predetermined set of events...the basic theme of the life history is the presentation of experience from the perspective of the focal subject or subjects. Their world most be penetrated and understood. Once it is entered, the observer lays out the critical-objective experience relevant to that world and then has his subject react to those events. In this way the subject's definition of the situation is compared to the objective events.

Although the life history method is inherently an individualistic-psychologistic technique, it can be effectively modified to assume a more sociologically adequate form. This can be effectively done by recording a group of actors' perspectives on a single event to assess differences in interpretations of focal events as a function of social structural location. In this way a discarded methodological procedure may be revived and rendered sociologically useful.

According to Becker (in Denzin, 1970a:419-428), the life history method has a number of virtues. In the first place it is particularly useful in providing insights into the subjective side of institutional processes. In addition, because of its wealth of detail it can be useful in providing new insights for hypothesis formulation in areas of study having grown stagnant. Finally, life histories may provide useful information of social processes which other methods are incapable of revealing. Frequently charges of biased and unreliable data have been raised against users of life histories but Cavan, Hauser, and Stouffer (in Denzin, 1970a:436-441) note that reliably coded life history data can serve important exploratory functions and can provide interpretations for quantitative findings expressed in statistical form.

In addition to the works of Becker and Cavan et. al. cited above, see Blumer (1939), Allport (1942), and Gottschalk et. al. (1945). More recent treatments of the life history method include Denzin (1970), and Schwartz and Jacobs (1979).

The three procedures briefly reviewed above are all reactive techniques. That is, the investigator becomes a part of the process he/she is investigating which may result in contaminating the phenomena under investigation. Clearly this direct intervention by the investigator in the process under study constitutes a major source of invalidity. To remedy this fundamental problem associated with reactive measures, qualitative researchers often employ a variety of nonreactive or unobtrusive measures. These measures include physical trace analysis, archival record analysis, and simple observations to include observations of exterior body and physical signs, expressive movement, physical location analysis, language analysis, and time sampling analysis.

Physical trace analysis involves "...recording the incidence, frequency, and distribution of social acts toward certain social objects through time and in various situations" (Denzin, 1970:264). Ideally physical trace analysis should be combined with other data on definitions and motivations of people underlying their actions toward social objects.

Archival record analysis simply refers to the analysis of public and private archival records. Important here is the work by ethnomethodologists such as Garfinkel, Cicourel and Kitsuse on the generation of organizational accounts which highlights the broader issue of the meanings which actors, differentially situated in organizations, impose upon such records. A succinct summary statement of Cicourel's (1963 and 1968) contribution in this regard in offered by Denzin (1970:267):

> In analyzing such records, sociologists are dealing with the transformations of conversations, haphazard observations, and negotiated interpretations into formalized and consensual statements concerning the occurrence of a particular set of events, the motivations underlying such occurrences, and the actions of the record keeper toward them.

Simple observations are a third type of unobtrusive measure refering to situations in which "...the observer has no control over the behavior or sign in question, and plays an unobserved, passive and unobtrusive role in the research situation" (Webb et. at., 1966:112). Among problems associated with simple observation measures is the fact that they are only appropriate for relatively small populations and public behavioral settings. Clearly these factors restrict their applicability.

Finally, unobtrusive measures generally do not lend themselves to causal analysis owing in part to their extreme behavioristic bias. Such an important limitation can only be overcome by employing, together with unobtrusive measures, other procedures which are more suited to uncovering the subjective dimensions of social conduct. For excellent discussions of unobtrusive measures see especially Denzin (1970) and Webb et. al.(1966).

II. Qualitative Research in Knowledge Use and School Improvement

A. The "Everyday" Character of Knowledge Production and Use

If the extant literature on knowledge utilization is any indication, the conclusion is inescapable that, notwithstanding the frequent employment of qualitative procedures generally for data collection purposes, utilization researchers have yet to come to terms with knowledge use as a form of practically rational conduct. A noteable exception is the thought provoking essay by Knorr (1981) entitled "Time and Context in Practical Action: On the Preconditions of Knowledge Use." The general lack of attention to the "practical problem" of use remains the case despite the fact that some researchers (Denzin, 1970; Holzner and Fisher, 1979; and, Larsen, 1979) have recognized the particular applicability of qualitative procedures for uncovering the subjective dimensions of use while study after study confirms the finding that knowledge is more apt to be used when the user perceives a fit between that knowledge and various practical exigencies surrounding the performance of his/her organizational role.

This puzzling state of affairs signals the need for the development of models of the use phenomenon which might direct the researcher's attention to previously neglected subjective aspects of knowledge use and to the employment of those particular methods especially suited to uncovering those aspects. To this end the model proposed herein is offered. Simply put, the model seeks to uncover those elements constitutive of what we might refer to as the "everyday" character of knowledge production and use. Assumptions will be grouped under both natural and theoretic stances taken toward the "everyday" character of knowledge production and use. From the standpoint of the natural stance, elements definitive of situated practices engaged in by actors involved in knowledge production and use will be identified and discussed. In addition to this, assumptions common to the theoretic stance will be identified and discussed. Here we will be primarily concerned with conceptual and methodological implications, derivable from the qualitative conception of knowledge use, of importance to the qualitative observer assuming the theoretic stance.

According to Husserl (in Natanson, 1962) and Schutz (1962), the natural stance is that stance taken by actors in everyday life. "Taking the natural stance consists primarily in taking the standpoint of common sense, of acting within common sense" (Douglas, 1971:10). From this standpoint the everyday world as experienced by the actor takes on a taken-for-granted character. With the assumption of the natural attitude serious questions regarding everyday experience are not raised (Douglas, 1970:14). In addition to the assumption that the everyday world is taken for granted from the point of view of the natural stance, it is also assumed that the world as presented to ego is identical to the world as presented to alter. This assumption is what Schutz (1962) refered to as the "thesis of reciprocal perspectives" which constitutes a necessary precondition for the possibility of an intersubjectively available world (see Garfinkel, 1967: chap. 2; and, Douglas, 1970:85n).

For purposes here it is necessary to explicate identifiable properties of practically rational everyday activities and, more specifically, to treat knowledge producing and using activities as particular exemplifications of such practically rational activities. Thus the question can be posed as follows: What are some identifiable features of practically rational activities in general and of knowledge producing and using activities in particular? Answers to this question will serve as the assumption comprising the model of the "everyday" character of knowledge production and use from the point of view of the natural stance and will be designated natural stance assumptions (NSA's).

One of the most important distinguishing properties of practically rational conduct is intentionality. This property of common sense activity is highlighted by Schutz's (1962) dictum that our interests organize our constructs in the everyday world where component features of this world are addressed with "pragmatic motive" (Schutz, 1962:208-209; see also Heeren in Douglas, 1970:45) by actors mutually associated therein. The meanings attributed to objects attending everyday scenes of practically rational conduct are contingent upon the intentions, purposes or motives of actors engaged therein. This intentional character of practically rational conduct is of particular pertinence to the study of knowledge use in a two-fold sense. On one hand the production of knowledge in multiple forms as records, accounts, studies, reports etc. as well as the use of such forms of knowledge by persons other than the producers of them will always involve intentional action. On the other hand, decisions to use or not to use knowledge will always be, in part, based upon the criterion of practical adequacy. That is to say, from the standpoint of the natural attitude toward everyday life knowledge will be used to the extent that such use is practically adequate given the user's purposes at hand.

Included among the many studies emphasizing the intentional character of the generation of records are the following: Cochran et. al., 1980; Cicourel, 1968; Garfinkel, 1967: espec. chap. 6; McCleary, 1975; and, Zimmerman in Douglas, 1970:221-238. As Cochran et. al. (1980:6) suggest, records are proactive insofar as "...a record keeper's plans, goals, intentions and assumptions precede and therefore shape the record...People assemble and use records with some goal in mind." Among the many purposes for which records are generated, Cochran et. al.(1980:13) enumerate the following:

> ...to maintain interpersonal relationships, control the behavior of others, protect oneself, save time, eliminate busy work, avoid unwanted scrutiny, exercise direction over one's work, document cases that can be successfully resolved, and document that work has, in fact, been done.

This finding is consistent with analyses of records produced in juvenile probation agencies (Cicourel, 1968; and, McCleary, 1975), public assistance agencies (Zimmerman in Douglas, 1970:221-238), and in mental health clinics (Garfinkel, 1967:chap. 6). Among the six "normal, natural problems" of clinic records which Garfinkel (1967:192ff) identifies, two are of particular significance to the problem of the intentional character of record keeping. In the first place it is imperative to note that some self-reporting forms constitute rules of reporting conduct as a work obligation. Thus it is reasonable to assume that actors' accounts reported in such forms will reflect the purposeful attempt to verify compliance with work obligations. This suggests a second and related problem of records identified by Garfinkel. That is the fact that records entail risks to personal and organizational careers. Hence one would suspect that record producers would seek to avoid such risks to themselves and further that the information contained in the records would reflect this intention.

That the production of knowledgeable accounts is an intentional process is a fact suggested by the model of the "everyday" character of knowledge production and use and a fact which utilization researchers would do well to remember. Whether the production of records is taken as the object of inquiry or the records produced are simply treated as data in utilization studies, the researcher is well advised to attend to their proactive character. The intentional character of the produced records constitutes a threat to validity when it is ignored.

And if knowledge production is intentional or purposive, it is no less true of knowledge use. Decisions to use or not to use knowledge will ultimately rest upon the intentions of the actors as they attempt to solve the practical problems of their day-to-day routines. Failure to account for these practical problems confronting potential users by change agents and researchers will result in the imposition of a variety of resistances to utilization (Hofler, 1981).

The above discussion then yields our first natural stance assumption:

> NSA : THE PRODUCTION AND USE OF KNOWLEDGEABLE ACCOUNTS,
> 1 AS A FORM OF PRACTICALLY RATIONAL CONDUCT, IS AN
> INTENTIONAL PROCESS. ACCOUNTS PRODUCED REFLECT
> THIS INTENTIONALITY.

In addition to intentionality, another property of practically rational conduct is indexicality which refers to the broader contextual determination of meaning of constituent elements of everyday interaction scenes. This property expressed in Schutz's (1962) notion of the paramount reality of the Lebenswelt is reflected in two principles common to phenomenological sociology. The first of these is the principle of the integrity of the situation which holds that, "concrete human events are always to some degree dependent upon the situational context in which they occur and can adequately be explained only be taking into consideration that situational context" (Douglas, 1970:37). Related to this general principle is the more specific principle of the contextual determination of meaning which holds that, "the context within which a given statement or action occurs is of fundamental importance in determining the meanings imputed to it by the members of society" (Douglas, 1970,37).

There are two types of contexts which determine meanings: the linguistic context and the practical use context. Meanings of items are linguistic context dependent insofar as they are determined by other linguistic items, terms, statements, occurring in the same communicative situation. This indexical quality of language was first analyzed by Bar-Hillel (1954) and subsequently taken up in the work of linguistic ethnomethodologists such as Garfinkel, Cicourel, and Sacks. Meanings are practical use context dependent when they are determined by nonlinguistic aspects of the situation in which they occur. Such nonlinguistic situational aspects include time and place together with tacit assumptions about actors or objects of the interaction situation.

With respect to knowledge use, the indexical character of practically rational activities suggests that the meanings attributed by actors to features of knowledge use processes are determined by the broader contexts within which such concrete knowledge using activities occur. These broader contexts include a wide diversity of elements which combine to structure the more concrete knowledge using practices. These elements include time, place, personal and organizational commitments, status-roles of participant actors and most importantly actors' frames of reference which embody assumptional structures pertinent to the actors' use of knowledge. These assumptional structures include truth and utility tests which actors employ in their knowledge appraisals (Weiss and Bucuvalas, 1980; and, Holzner and Fisher, 1979).

The indexical nature of practically rational conduct signals the overall interpretive character of knowledge use when use activities are regarded as forms of practically rational conduct. Knowledge use will always involve competing interpretations held by a variety of stakeholders as to the "meaningful" content of knowledge products (Dunn and Holzner, 1980:3-4). One of the central tasks confronting utilization researchers is the unearthing of such interpretive structures or, we might say, attending to the indexical character of practically rational knowledge use activities.

Thus considered, our second natural stance assumption might read as follows:

> NSA_2 : KNOWLEDGE PRODUCTION AND USE, AS A FORM OF PRACTICALLY RATIONAL CONDUCT, IS INDEXICAL IN CHARACTER. IT INVOLVES THE IMPUTATION OF MEANINGS TO KNOWLEDGE PRODUCTS AND OTHER OBJECTS OF CONCRETE INTERACTION SCENES BY ACTORS ASSOCIATED THEREIN.

This second assumption is integrally related to a third assumption concerning the interactional quality of practically rational conduct. The world as presented to actors from within the standpoint of everyday life is experienced intersubjectively. While the indexical property of practically rational activities in general and, more specifically, of knowledge producing and using activities so considered highlights the importance of the broader contextual determination of meanings of such activities and their constituent components, the interactional quality directs our attention to the negotiated character of these meanings and interpretations imputed to such activities and constituent components thereof.

Knorr (1981:17) provides the best statement on the interactive nature of knowledge use activities to be found in the utilization literature. She notes:

> ...the basic observables of practical action will have to be conceptually specified as interacts rather than acts. This entails that decisions...must be seen as in principle negotiated, which means that they arise out of the consideration of or out of direct confrontation with other relevant agents. And issues like the practical relevance or political feasibility of research results must be seen not only as interpreted in context, but as resulting from a direct or indirect confrontation of opinions in a process which is fundamentally a process of contestation and negotiation.

Appreciation of the interactive character of knowledge use activities then directs our attention to both the contested nature of claims employed in knowledge appraisals and the dynamic nature of frames of reference within which such claims are embedded. On the one hand the interaction focus is on the interactants themselves or the variety of stakeholders mutually associated in interactive processes of knowledge transactions. Here it is important to note that insofar as knowledge use entails changes in familiar behavioral patterns of potential users, such changes, anticipated or real, may foster resistance to use and provide a basis for contestation. Hofler (1981) provides useful insights here. On the other hand the interaction focus is on the knowledge claims themselves and the question becomes one of how claims employed in knowledge appraisals are interrelated and how knowledge use varies as a function of different patterns of interrelationships among claims. (This is the multiattribute problem specified in Dunn and Holzner, 1980).

Together then these issues suggest the importance of the interactive property of practically rational knowledge use activities, and provide us with the third natural stance assumption of the "everyday" character of knowledge production and use model:

> NSA : KNOWLEDGE PRODUCTION AND USE, AS PRACTICALLY RATIONAL
> 3 ACTIVITIES, ARE INTERATIVE. DECISIONS REGARDING USE TOGETHER WITH OTHER MEANINGS IMPUTED TO ELEMENTS CONSTITUTING PRODUCTION AND USE ACTIVITIES ARE, IN PRINCIPLE, NEGOTIATED BY ASSOCIATED INTERACTANTS.

These three assumptions concerning knowledge production and use activities are grounded in the natural stance position taken toward such activities regarded as practically rational conduct. Specifically, these assumptions taken together paint a picture of selected identifiable properties of the knowledge production and use phenomenon considered as a phenomenon of everyday life.

Such consideration of knowledge production and use activities as a phenomenon of everyday life involves a related set of assumptions concerning both conceptual and methodological implications following from this particular view of the phenomenon. Here the emphasis is upon the treatment of everyday life and, more specifically, of knowledge production and use activities considered as such as a phenomenon or object of inquiry. The observer stands apart from the everyday world and investigates features thereof from the theoretic stance. In the words of Douglas (1971:10), "...taking the theoretic stance consists in standing back from common sense and studying common sense to determine its nature." Thus specification of additional assumptions comprising our model of the "everyday" character of knowledge production and use involves taking the observer's point of view toward the phenomenon of "everyday" knowledge production and use activities. That is, we will identify and discuss selected conceptual and methodological implications which observers or utilization researchers should attend to, given the"everyday" character of knowledge production and use. These assumptions will be designated theoretic stance assumptions (TSA's).

Treating knowledge production and use as practically rational activities or as an "everyday" phenomenon signals the need to develop particular conceptual formulations appropriate thereto. It is worthwhile noting that the utilization literature has generally been characterized by a persistent neglect of the "practical problem" of knowledge production and use, a neglect reflected in a variety of elements of the conceptual apparati to be found in this literature. The issue of the "two communities" metaphor (see Caplan, 1979; Caplan et. al., 1975; Dunn, 1980; and, Rich, 1979) may serve as an interesting case in point.

The two communities metaphor addresses attention to the relationship between the social scientific community of knowledge producers and the policy making community of knowledge users. The metaphor has the benefit of highlighting significant subjective features of knowledge use by treating both communities as ensembles of different meaningful claims employed in knowledge appraisals by actors differentially located in social organizations (see Dunn, 1980). Yet despite this significant contribution provided by this conceptual metaphor, a contribution which should be duly emphasized, use of the metaphor entails certain problems given the consideration of knowledge production and use as an "everyday" phenomenon. Use of the metaphor does not go far enough in addressing the everyday character of knowledge producing and using activities.

Specifically, use of the metaphor involves the unfortunate tendency to radically separate knowledge producing and using activities. On one hand producers are regarded as being located in particular organizations where they employ a specific set of claims regarding knowledge while on the other hand users occupy positions in different organizations and employ different knowledge claims. So considered, knowledge transactions assume the form of transfers of knowledge products or bits from one location where they are produced by one set of actors to another location where they are used by another set of actors.

Such a conception is fraught with a variety of shortcomings, not the least important of which is the denial of the benefits associated with reflexive sociological inquiry. When the "everyday" character of knowledge producing and using activities is taken seriously, the vast gap between production and use suggested by the two communities metaphor disappears. Regarded as an everyday phenomenon, knowledge production is at one and the same time knowledge use. Afterall, the production of knowledge will always have for its end certain purposes or aims arising out of the concrete occasions of that production. Even among our producers of social scientific knowledge, the knowledge produced will simultaneously be used to fulfill a variety of purposes such as procurement of research monies, education and professionalization of students, career advancement and professional certification just to name a few. And decisions with respect to what knowledge in produced-used will be in part a function of the social scientist's determination of his/her own purposes at hand.

Thus the "everyday" notion of knowledge production and use invites the utilization researcher to reflexively consider his/her own conduct. Such consideration may be seen to fulfill a two-fold purpose. On one hand it should serve to sensitize the researcher to important features of the user's conduct while on the other hand alerting him/her to previously unrecognized characteristics of his/her own conduct. From this point of view the researcher's own practically rational activity becomes a topic of investigation as well as a resource for investigation, as he/she renders observable the reflexive character of practical activities. Awareness of this reflexive property of practical action is a fundamental precondition of ethnomethodological inquiry as exemplified in the works of Garfinkel and Cicourel.

Attention to such reflexivity is of even broader significance in that it points to the need for the development of grounded theory and concepts (Glaser and Strauss, 1976; and, Dunn and Swierczek, 1977) which have their underpinnings in practical action rather than ungrounded conceptualizations which obscure the "everyday" character of knowledge production and use.

The above discussion suggests two theoretic stance assumptions:

TSA : 1 CONCEPTUALIZATIONS REGARDING KNOWLEDGE USE WHICH ARE GROUNDED IN PRACTICAL USE ACTIVITIES, THEREBY MORE ADEQUATELY REFLECTING FEATURES OF SUCH ACTIVITIES, SHOULD BE EMPLOYED OVER CONCEPTUALIZATIONS WHICH DISTORT THE COMMON SENSE CHARACTER OF USE ACTIVITIES.

TSA : 2 PRACTICAL ACTIVITIES OF UTILIZATION RESEARCHERS SHOULD BE REGARDED AS TOPICS OF AS WELL AS RESOURCES FOR INVESTIGATION.

In addition, treating knowledge production and use as practically rational activities suggests the need to employ specific methodologies appropriate to the "everyday" character of the phenomenon. On one hand, insofar as knowledge production and use activities are subjective in character involving actors' intentions, purposes, aims, etc. methodological techniques which have as their aim the uncovering of the subjective interpretations of action will have to be employed (Larsen, 1979; and, Dunn, 1980). It should be emphasized that such qualitative data are particularly vulnerable to assorted contaminating influences of the researcher and the investigative process itself. And taking into account this special character of qualitative data, only those methodological procedures which retain the integrity of the phenomena should be employed.

In addition to being subjective, problems of knowledge use tend to be interdependent, thus methodological techniques should be holistic in character. They should take account of the interdependencies among knowledge use problems (Dunn, 1980). This brief discussion yields our third theoretical stance assumption:

> TSA$_3$: METHODOLOGICAL TECHNIQUES EMPLOYED IN UTILIZATION STUDIES SHOULD BE SUBJECTIVE, HOLISTIC, AND SHOULD RETAIN THE INTEGRITY OF THE PHENOMENA.

Together then these assumptions comprise our model of the "everyday" character of knowledge production and use. They should not be regarded as exhaustive but merely as preliminary attempts to outline a particular view of the phenomenon of knowledge use which has generally been absent in the utilization literature. Thus the model invites the researcher's attention to the "everyday" practically rational character of the knowledge use phenomenon.

Having specified the internal components of the model it is necessary to proceed to the assessment of the extent to which the application of qualitative methodological procedures in studies of knowledge use and school improvement is consistent with elements of the model. Our review of this research literature will utilize the three knowledge use research problems discussed in the above as an organizing frame.

B. Review of Research on Knowledge Use and School Improvement by Research Problem with Attention to Qualitative Procedures

The vast body of educational research literature bears witness to a pronounced interest in and employment of a variety of qualitative methodologies (see Chart I prepared by Wolcott (1980) on following page). One of the methodologies most frequently used by educational researchers is ethnography which is now more commonly found in the modern classroom than in the preliterate tribe (see Erikson, 1973; Everhart, 1975, 1976; Lutz and Ramsey, 1974; Mulhauser, 1975; Rist, 1975; Stake, 1978; Wilson, 1977; and, Wolcott, 1975). And while the classroom has served as the site for the employment of more conventional ethnographic methods by educational researchers, it has also been the object of study by growing numbers of ethnomethodologists wielding a variety of unconventional research tools. Whether the topic is differences in reality construction between children and adults (Cicourel et. al., 1974; Handel, 1972; Jennings, 1972; Leiter, 1971; MacKay, 1973, 1974; mehan, 1973; and, Roth, 1972) or the social construction of student performances (Cicourel and Kitsuse, 1963; and, Leiter in Cicourel et. al., 1974), the classroom has become a common site of ethnomethodological investigation.

It could be expected that such marked attention to the use of qualitative

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November 1980

DIFFERING STYLES OF "ON-SITE" RESEARCH: A WORKSHEET

Chart I

Genre	Variations	Commitment/Intent	Origin	Pristine sources	Examples in educational research
ETHOLOGY		Description of patterns of social behavior	Biology, Zoology	Ambrose 1978	Jones 1972
NON-PARTICIPANT OBSERVATION	Behavior settings Classroom interaction	Observer acknowledged but uninvolved			Biddle 1967; Barker & Wright 1955; Jackson 1968 Barker 1968; Gump 1967 Cazden; F. Erickson; Shuy; Bossert, 1979
INVESTIGATIVE JOURNALISM		Story-centered?	Journalism		Dooly; Mayer 1961; Wiseman (film "High School")
CONNOISSEURSHIP		The private act of appreciation	Artistic criticism		Eisner 1979; McCutcheon 1978
PHENOMENOLOGY		"I am a camera"; all experience subjective		Giorgi 1970; Merleau-Ponty 1964	
PARTICIPANT OBSERVATION	On-site research Observational; naturalistic Collaborative research	Observer present and may participate	Anthropology; "Chicago School" Sociology	Whyte 1955; Bruyn 1966	Cusick 1973; Smith 1979 Herriott & Gross 1979 Ogbu 1978; Wolf & Tymitz 1977 Smith & Geoffrey 1968; Filby et al. 1980
CASE STUDY	Single subjects N=1	A case "of" something One individual through time	Multiple	Harvard Business School "cases", etc. Hersen & Barlow 1976	Stake 1980; Reid & Walker 1975
ETHNOMETHODOLOGY	Conversational analysis "Micro-micro" ethnography	How people make sense of their everyday lives	Sociology Sociolinguistics Sociolinguistics	Garfinkel 1967	Cicourel et al. 1974 Shultz; Florio; Mehan Above; also McDermott 1976; F. Erickson
FIELD STUDY	Grounded theory Field study in formal organizations	Observe, interview, enumerate	Sociology	Zelditch 1962 Glaser & Strauss 1967 See Admin Sci Qtrly Winter 1980	Becker 1961 Most of Louis M. Smith's work (see Smith 1979) Lutz & Iannaccone 1969
ORAL HISTORY	Life history	Non-recorded history	Anthropology, Folklore, History Anthropology Biography, History		
NATURAL HISTORY		Attend to "classes of events"	Anthropology	Becker	Kimball 1955
ETHNOGRAPHY	Macro-ethnography Community study Micro-ethnography	Cultural interpretation	Anthropology	Malinowski 1922; Geertz 1973 Pelto & Pelto 1978 Arensberg/Kimball 1940	F. Erickson 1973; Wolcott 1978 Henry 1963 Ogbu 1974; Wolcott 1967; Warren 1967 Spindler 1981; Wolcott 1973
ETHNOLOGY		Systematic comparisons across ethnographies	Anthropology		Nothing done yet

NOTES: On this chart I have identified several contrasting styles of qualitative/descriptive research in which the researcher is in some way "present." The current version has benefitted by suggestions from Lee Cohen, Carole Edelsky, and others, but is still an early draft. Where dates are included with names, bibliographic references are provided on an accompanying handout. The attempt here is to provide illustrative sources. Those of you more familiar than I am with the talents and interests of ASU faculty can help fill in the roster in the column at the right.

Two noteworthy references on qualitative research in schools are the overview provided by Louis M. Smith (1979) and a forthcoming volume on school ethnography being edited by George Spindler (1981). HW.

procedures in the educational research literature generally would be paralleled by employment of qualitative procedures in the more specific area of knowledge utilization research in educational settings. While this is precisely the case as we shall immediately see below, those qualitative procedures employed in utilization studies are of the conventional variety. Indeed, more uncommon ethnomethodological techniques are conspicuous by their absence in this literature.

1. The Criterion Problem: Research Review

The nature of the criterion problem is best captured in the question posed by Larsen (1980), "Knowledge Utilization: What is it?". While at first glance this question seems rather simple, upon further reflection it becomes apparent that this question implies a host of other questions; the criterion problem is a composite including a number of more specific problems. And the application of qualitative procedures would appear to be particularly appropriate in utilization researchers' attempts to resolve these problems. It is necessary to turn now to a review of some of these representative attempts. Corbett and Firestone (1980) identify four strategies for increasing the use of research in policy making. These include the enlightenment-transfer, engineering-transfer, enlightenment-transaction, and the engineering-transaction strategies. The enlightenment-engineering designations characterize differing research designs employed, basic and applied respectively, while the transfer-transaction designations describe differing methods of disseminating information. The authors advise qualitative researchers especially to use either of the two transfer strategies.

An interesting example of the effective employment of qualitative procedures in an analysis of the knowledge transfer process in educational settings in provided by William Donner (1980), a colleague of Corbett and Firestone at Research for Better Schools, Inc. (RBS). Donner (1980) reports on a two year longitudinal study of five schools conducted by RBS. The effort involved the development of research-based approaches to facilitate the improvement of the schools' programs in two areas, basic skills and career education. Three research questions were posed: 1) What is the nature of the knowledge transfer process? 2) How is research knowledge combined with "practical" knowledge in the transfer process? 3) How is research knowledge interpreted, understood and used by teachers?

Although the third research problem is related to the criterion problem, it deals more specifically with the diversity problem. Hence our treatment of this aspect of Donner's work will be taken up in the following section. It is interesting to note that the specification of these particular problems for research reflects a prior appreciation of the "everyday" character of knowledge use. And posing the questions in these terms implies the particular applicability of qualitative procedures.

The two data gathering procedures employed were observation and interviews. In the first year field workers observed project meetings with RBS representatives and participants from participating school districts. In the second year researchers spent more time on-site in the participating schools. Throughout both years teachers, administrators and linking agents were interviewed both formally and informally. Each field worker concentrated on one or two schools and field notes were made available to the entire research staff who conducted ongoing discussions about their findings.

Researchers found the knowledge transfer process to consist of four analytically distinct stages that overlapped in time: inhouse development of component approaches and materials, presentation by linkers, trial and use by teachers, and feedback to developers for revision. Furthermore, researchers found that practical knowledge entered into every stage. As Donner (1980:54) concludes:

> The entire process of research into practice can be viewed as a tension between two poles. At one pole there is research and knowledge about a content area. At the other pole there is the practical circumstances of schools and classrooms. For new knowledge to be used, it must fit into the practical circumstances of schools and classrooms.

Although Donner is not more explicit about the specifics of his data collection techniques, it is clear that the "practical" character of the knowledge transfer process could only be uncovered by the use of qualitative procedures. Thus his work at least serves to demonstrate a fundamental principle underlying qualitative methodology; that is, methodological techniques are problem-specific.

An interesting application of the focused interview may be found in the work of Hall, Loucks and their associates at the Research and Development Center for Teacher Education at the University of Texas at Austin. Research at the Procedures for Adopting Educational Innovations Project of the R&D Center focuses on a model of innovation adoption, the Concerns-based Adoption Model (CBAM). The model is composed of two dimensions: Stages of

Concern about the innovation (SoC) and Levels of Use of the innovation (LoU). Here we will be primarily concerned with the LoU dimension.

Hall, Loucks and their associates conceive of innovation use as an eight stage process which ranges from lack of awareness of the innovation to active searching for alternatives to or modifications of the innovation. As Hall et. al. (1975) suggest:

> Levels of Use are distinct states that represent observably different types of behavior and patterns of innovation use as exhibited by individuals and groups. These levels characterize a user's development in acquiring new skills and varying use of the innovation. Each level encompasses a range of behaviors, but is limited by a set of identifiable decision points (see Chart II - LoU Chart on following page).

To measure individual user's LoU the researchers employ the focused interview technique characterized by specific objectives for questioning though devoid of standardized questions. More rigorous standardization of questions typical of the structured interview is eschewed in favor of greater flexibility given the complexity of the LoU concept. This technique permits more true-to-life responses and greater individualization of follow-up questions to respondents, a necessary precondition for fulfillment of interview objectives.

The LoU interview is also characterized by its generic quality. That is to say that it is not specific to any single innovation but rather the questions can be used for different innovations. Another interesting feature of the interview is its branching format. The interviewer asks questions to locate the respondent at specific decision points and then intensively probes the model's categories to more precisely locate the individual's LoU (see Chart III on p. 42).

LEVELS OF USE

Chart II — LoU CHART

CATEGORIES

SCALE POINT DEFINITIONS OF THE LEVELS OF USE OF THE INNOVATION	KNOWLEDGE	ACQUIRING INFORMATION	SHARING
Levels of Use are distinct states that represent observably different types of behavior and patterns of innovation use as exhibited by individuals and groups. These levels characterize a user's development in acquiring new skills and varying use of the innovation. Each level encompasses a range of behaviors, but is limited by a set of identifiable Decision Points. For descriptive purposes, each level is defined by seven categories.	That which the user knows about characteristics of the innovation, how to use it, and consequences of its use. This is cognitive knowledge related to using the innovation, not feelings or attitudes.	Solicits information about the innovation in a variety of ways, including questioning resource persons, corresponding with resource agencies, reviewing printed materials, and making visits.	Discusses the innovation with others. Shares plans, ideas, resources, outcomes, and problems related to use of the innovation.
LEVEL 0 **NON-USE**: State in which the user has little or no knowledge of the innovation, no involvement with the innovation, and is doing nothing toward becoming involved.	Knows nothing about this or similar innovations or has only very limited general knowledge of efforts to develop innovations in the area.	Takes little or no action to solicit information beyond reviewing descriptive information about this or similar innovations when it happens to come to personal attention.	Is not communicating with others about the innovation beyond possibly acknowledging that the innovation exists.
DECISION POINT A	*Takes action to learn more detailed information about the innovation.*		
LEVEL I **ORIENTATION**: State in which the user has acquired or is acquiring information about the innovation and/or has explored or is exploring its value orientation and its demands upon user and user system.	Knows general information about the innovation such as origin, characteristics, and implementation requirements.	Seeks descriptive material about the innovation. Seeks opinions and knowledge of others through discussions, visits, or workshops.	Discusses the innovation in general terms and/or exchanges descriptive information, materials, or ideas about the innovation and possible implications of its use.
DECISION POINT B	*Makes a decision to use the innovation by establishing a time to begin.*		
LEVEL II **PREPARATION**: State in which the user is preparing for first use of the innovation.	Knows logistical requirements, necessary resources and timing for initial use of the innovation, and details of initial experiences for clients.	Seeks information and resources specifically related to preparation for use of the innovation in own setting.	Discusses resources needed for initial use of the innovation. Joins others in pre-use training, and in planning for resources, logistics, schedules, etc., in preparation for first use.
DECISION POINT C	*Begins first use of the innovation.*		
LEVEL III **MECHANICAL USE**: State in which the user focuses most effort on the short-term, day-to-day use of the innovation with little time for reflection. Changes in use are made more to meet user needs than client needs. The user is primarily engaged in a stepwise attempt to master the tasks required to use the innovation, often resulting in disjointed and superficial use.	Knows on a day-to-day basis the requirements for using the innovation. Is more knowledgeable on short-term activities and effects than long-range activities and effects of use of the innovation.	Solicits management information about such things as logistics, scheduling techniques, and ideas for reducing amount of time and work required of user.	Discusses management and logistical issues related to use of the innovation. Resources and materials are shared for purposes of reducing management, flow and logistical problems related to use of the innovation.
DECISION POINT D-1	*A routine pattern of use is established.*		
LEVEL IV A **ROUTINE**: Use of the innovation is stabilized. Few if any changes are being made in ongoing use. Little preparation or thought is being given to improving innovation use or its consequences.	Knows both short- and long-term requirements for use and how to use the innovation with minimum effort or stress.	Makes no special efforts to seek information as a part of ongoing use of the innovation.	Describes current use of the innovation with little or no reference to ways of changing use.
DECISION POINT D-2	*Changes use of the innovation based on formal or informal evaluation in order to increase client outcomes.*		
LEVEL IV B **REFINEMENT**: State in which the user varies the use of the innovation to increase the impact on clients within immediate sphere of influence. Variations are based on knowledge of both short- and long-term consequences for clients.	Knows cognitive and affective effects of the innovation on clients and ways for increasing impact on clients.	Solicits information and materials that focus specifically on changing use of the innovation to affect client outcomes.	Discusses own methods of modifying use of the innovation to change client outcomes.
DECISION POINT E	*Initiates changes in use of innovation based on input of and in coordination with what colleagues are doing.*		
LEVEL V **INTEGRATION**: State in which the user is combining own efforts to use the innovation with related activities of colleagues to achieve a collective impact on clients within their common sphere of influence.	Knows how to coordinate own use of the innovation with colleagues to provide a collective impact on clients.	Solicits information and opinions for the purpose of collaborating with others in use of the innovation.	Discusses efforts to increase client impact through collaboration with others on personal use of the innovation.
DECISION POINT F	*Begins exploring alternatives to or major modifications of the innovation presently in use.*		
LEVEL VI **RENEWAL**: State in which the user reevaluates the quality of use of the innovation, seeks major modifications of or alternatives to present innovation to achieve increased impact on clients, examines new developments in the field, and explores new goals for self and the system.	Knows of alternatives that could be used to change or replace the present innovation that would improve the quality of outcomes of its use.	Seeks information and materials about other innovations as alternatives to the present innovation or for making major adaptations in the innovation.	Focuses discussions on identification of major alternatives or replacements for the current innovation.

Procedures for Adopting Educational Innovations Project, Research and Development Center for Teacher Education, University of Texas at Austin, 1975, N.I.E. Contract No. NIE-C-74-0087.

from HALL, G. et al. (1975) "Levels of use of the innovation: A framework for analyzing innovation adoption." Journal of Teacher Education, 26, 1:52-56.

FIGURE 1 — LoU CHART

CATEGORIES

ASSESSING	PLANNING	STATUS REPORTING	PERFORMING
Examines the potential or actual use of the innovation or some aspect of it. This can be a mental assessment or can involve actual collection and analysis of data.	Designs and outlines short- and/or long-range steps to be taken during process of innovation adoption, i.e., aligns resources, schedules activities, meets with others to organize and/or coordinate use of the innovation.	Describes personal stand at the present time in relation to use of the innovation.	Carries out the actions and activities entailed in operationalizing the innovation.
Takes no action to analyze the innovation, its characteristics, possible use, or consequences of use.	Schedules no time and specifies no steps for the study or use of the innovation.	Reports little or no personal involvement with the innovation.	Takes no discernible action toward learning about or using the innovation. The innovation and/or its accouterments are not present or in use.
Analyzes and compares materials, content, requirements for use, evaluation reports, potential outcomes, strengths and weaknesses for purpose of making a decision about use of the innovation.	Plans to gather necessary information and resources as needed to make a decision for or against use of the innovation.	Reports presently orienting self to what the innovation is and is not.	Explores the innovation and requirements for its use by talking to others about it, reviewing descriptive information and sample materials, attending orientation sessions, and observing others using it.
Analyzes detailed requirements and available resources for initial use of the innovation.	Identifies steps and procedures entailed in obtaining resources and organizing activities and events for initial use of the innovation.	Reports preparing self for initial use of the innovation.	Studies reference materials in depth, organizes resources and logistics, schedules and receives skill training in preparation for initial use.
Examines own use of the innovation with respect to problems of logistics, management, time, schedules, resources, and general reactions of clients.	Plans for organizing and managing resources, activities, and events related primarily to immediate ongoing use of the innovation. Planned-for changes address managerial or logistical issues with a short-term perspective.	Reports that logistics, time, management, resource organization, etc., are the focus of most personal efforts to use the innovation.	Manages innovation with varying degrees of efficiency. Often lacks anticipation of immediate consequences. The flow of actions in the user and clients is often disjointed, uneven and uncertain. When changes are made, they are primarily in response to logistical and organizational problems.
Limits evaluation activities to those administratively required, with little attention paid to findings for the purpose of changing use.	Plans intermediate and long-range actions with little projected variation in how the innovation will be used. Planning focuses on routine use of resources, personnel, etc.	Reports that personal use of the innovation is going along satisfactorily with few if any problems.	Uses the innovation smoothly with minimal management problems; over time, there is little variation in pattern of use.
Assesses use of the innovation for the purpose of changing current practices to improve client outcomes.	Develops intermediate and long-range plans that anticipate possible and needed steps, resources, and events designed to enhance client outcomes.	Reports varying use of the innovation in order to change client outcomes.	Explores and experiments with alternative combinations of the innovation with existing practices to maximize client involvement and to optimize client outcomes.
Appraises collaborative use of the innovation in terms of client outcomes and strengths and weaknesses of the integrated effort.	Plans specific actions to coordinate own use of the innovation with others to achieve increased impact on clients.	Reports spending time and energy collaborating with others about integrating own use of the innovation.	Collaborates with others in use of the innovation as a means for expanding the innovation's impact on clients. Changes in use are made in coordination with others.
Analyzes advantages and disadvantages of major modifications or alternatives to the present innovation.	Plans activities that involve pursuit of alternatives to enhance or replace the innovation.	Reports considering major modifications of or alternatives to present use of the innovation.	Explores other innovations that could be used in combination with or in place of the present innovation in an attempt to develop more effective means of achieving client outcomes.

From Loucks, S. et al. (1975) Measuring Levels of [illegible] of [illegible] Innovation: [illegible] Manual for Trainers, Interviewers, and Raters. Procedures for Adopting Educational Innovations Project/CBAM, The Research and Development Center for Teacher Education, University of Texas at Austin.

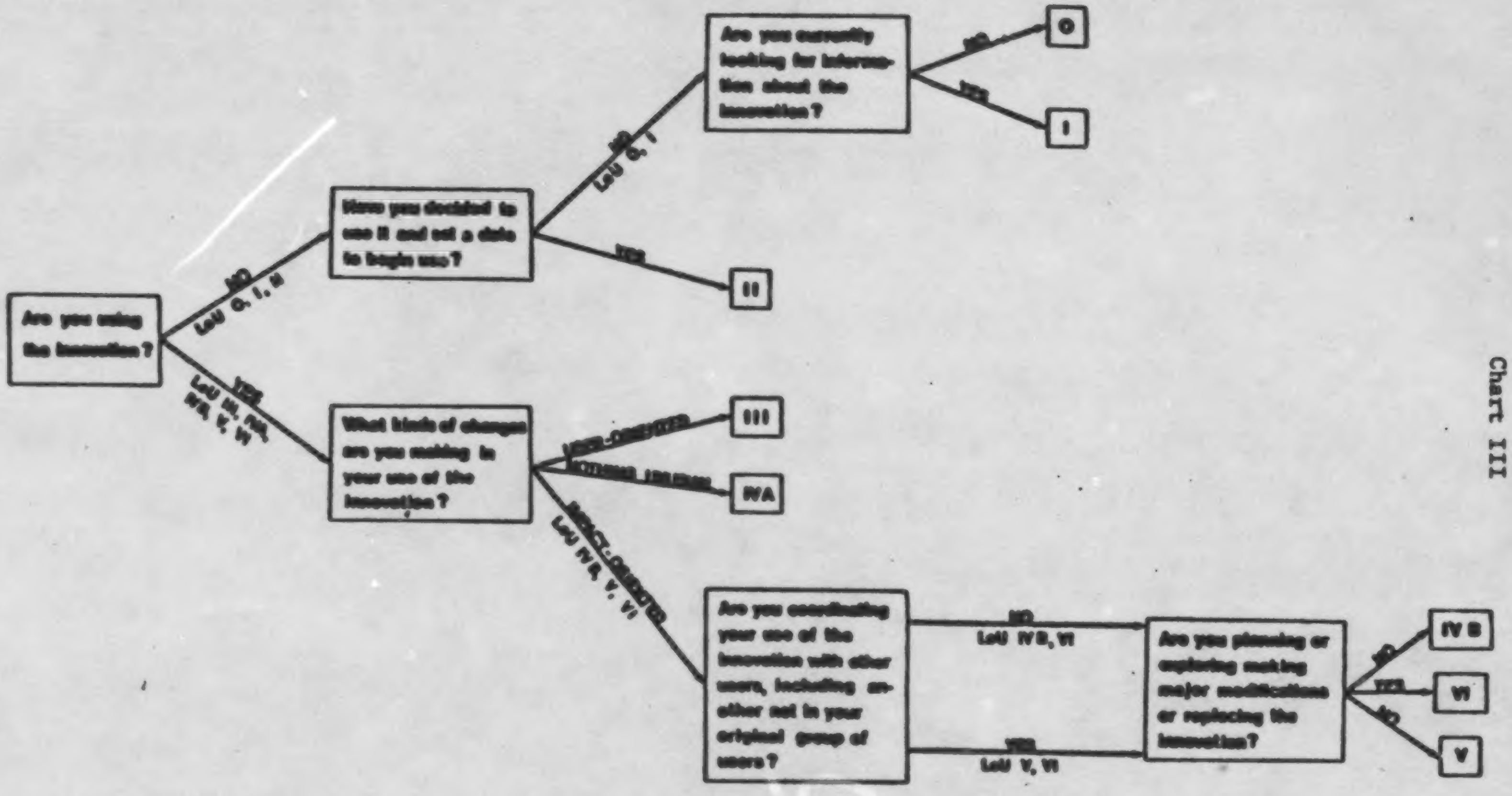
Are you using the innovation?
NO
LoU O, I, II
YES
LoU III, IVA, IVB, V, VI
Have you decided to use it and set a date to begin use?
NO
LoU O, I
YES
II
Are you currently looking for information about the innovation?
NO
O
YES
I
What kinds of changes are you making in your use of the innovation?
USER-ORIENTED
III
IVA
IMPACT-ORIENTED
LoU IVB, V, VI
Are you coordinating your use of the innovation with other users, including another not in your original group of users?
NO
LoU IVB, VI
YES
LoU V, VI
Are you planning or exploring making major modifications or replacing the innovation?
NO
IV B
YES
VI
NO
V

FIGURE 3. Overview of Branching Format of the LoU Interview

Chart III

After the interview data is collected it is rated and rater reliability is assessed in two ways. "Individual raters are evaluated through examination of their percent of agreement with other raters. The system as a whole is evaluated through recourse to standard reliability coefficients" (Loucks et. al., 1975:46). Hall and Loucks (1977) also report on a validity study of the LoU interview procedure which employed ethnographic observation. As Hall and Loucks (1977:267-268) report:

> Based on the LoU interview ratings, seventeen teachers representing a stratified sample including all LoU levels were selected for ethnographic observation. Ethnographers spent one full day with each teacher...the ethnographers assigned an LoU rating to the teachers and developed a set of written protocols.
>
> Two major comparisons of the data were made as estimates of the validity of the LoU interview: (1) the ethnographer's LoU rating of the teacher was compared with the consensus LoU interview rating, and (2) the consensus ratings of independent readers of the protocols were compared with the consensus LoU interview rating.

The correlation coefficient for the first comparison was .98, while for the second it was .65.

The work of Hall and his associates then demonstrates the uniquely enlightened use of conventional qualitative techniques both for primary data collection purposes and for validity assessment of research instruments. Such work constitutes a major contribution to the field of knowledge use and school improvement.

This work is rather unique in another way as well. The emphasis is clearly upon an overarching conception of use which treats different use behaviors as discrete phases in or dimensions of use in general. The implication is that users always and everywhere, regardless of their characteristics or characteristics of the innovation/knowledge itself, will progress in due course through the stages of the use process. The central focus is on use in general rather than on the user in particular.

This emphasis is rather exceptional in the knowledge use and school improvement literature where attention to multiple types of different and specific uses of knowledge seen to vary as a function of the user's social structural position is more commonly found. A number of studies identify different use patterns with different user attributes. Among these are included the following: Berman and McLauglin, 1977; Culbertson, 1977; Daft and Becker, 1978; Donner, 1980; Emrick and Peterson, 1978; Froh and Muraki, 1980; Fullan, 1980; Hood et. al., 1976; Louis, 1978; Miles et. al., 1978; Rosenblum and Louis, 1979; and, Sieber, 1981.

While Emrick and Peterson (1978), Miles et. al. (1978), Louis (1978), and Rosenblum and Louis (1979) emphasize the role of leaders, especially school administrators, in supporting the utilization process, Berman and McLauglin (1977), Daft and Becker (1978), Hood et. al. (1976) focus on the teacher as knowledge user. A good review of the literature on teachers, principals, and superintendents as knowledge use agents is provided in Fullan (1980).

All of these studies employ conventional survey and/or observation and interviewing techniques for data collection purposes in their research designs. Responses to questions about different types of use are seen to covary with specific attributes of the user to include status-position, educational level, prior experience with utilization efforts, etc. It should be noted that the way in which positional location of the user is defined has important implications for the level of precision in the specification of use behavior. Rather than focus on mere incumbency in a status-position, it is necessary to regard the actor's self-definition of his/her role as well as the multiple practical problems associated with the performance of particular roles as implying important use-pertinent implications. These variables could be expected to influence use behavior by either constraining or facilitating use as well as by serving as inducements to the modification of knowledge-in-use in a variety of ways. For example, studies of teachers (Jackson, 1968 and Lortie, 1975) emphasize the pragmatic, practical, and concrete character of "teacher culture." And studies of teachers as knowledge users document the constraining influence which practical considerations of the teacher role have on use behavior (see especially Donner, 1980; Froh and Muraki, 1980; and, Fullan, 1980).

This suggests the need to develop broader conceptions of user attributes generally and of social structural location specifically. Particularly, utilization researchers must examine the subjective elements in use behavior, elements which highlight the interpretive character of knowledge use. This is precisely the focus of our second problem, the diversity problem.

2. The Diversity Problem: Research Review

The diversity problem emphasizes the interpretive character of knowledge use by focusing upon the assumptions, embedded in frames of reference, which actors employ in their appraisals of knowledge. Assumptions may be regarded as taking the form of a variety of tests, relevance, truth, and utility, employed in knowledge appraisals (see Dunn, 1981; Dunn and

Holzner, 1980; Holzner and Fisher, 1979; and, Weiss and Bucuvalas, 1980). The diversity problem, or the assessment of these assumptions, entails a number of methodological implications for utilization researchers. On one hand it is necessary to employ techniques to determine the extent to which such assumptions are contingent upon attributes of the knowledge or information transferred itself, as well as attributes of the broader contextual situation of use. Here attention must be paid to the broader aspects of social structural location to include purposes, intentions, and practical considerations adhering to actors' status-roles. Qualitative procedures are particularly applicable here. On the other hand, novel directed techniques which have as their explicit purpose the uncovering of actors' assumptions about knowledge use will have to be borrowed from related fields or developed de novo by utilization researchers.

An interesting application of conventional qualitative procedures (observation and interviews) to the problem of the practical contextual basis of knowledge use-pertinent assumptions may be found in the work of Donner (1980) mentioned above. Attention to the diversity problem is evinced in the formulation of one of his research questions viz. "How is research knowledge interpreted, understood and used by teachers?" (Donner, 1980:4). Donner notes that a number of practical problems are inhibitive of more extensive knowledge use. Among these are included the following: amount of time required to implement project tasks; complexity of project tasks and procedures; prior negative experiences with use efforts; conflicting definitions of project elements between researchers and users; and, collegial pressure among potential users.

Interpretations of knowledge then will always be embedded in the myriad of practical considerations surrounding the performance of particular roles. As mentioned above, a number of studies (Donner, 1980; Froh and Muraki, 1980; Fullan, 1980; and, Sieber, 1968) focus upon the practical problems surrounding the teacher's role and the consequences of these on knowledge utilization. This suggests the need to broaden the definition of status-role to include sets of role-specific practical problems adhering to specific roles which serve as foundations upon which arise more specific tests pertinent to assessments of knowledge claims. Qualitative field methods are uniquely suited to uncover these practical elements of use.

An interesting directed technique which may be of use in uncovering assumptions pertinent to knowledge use may be found in the related evaluation research literature, specifically in Policy Implications Analysis (PIA) as proposed by Madey and Stenner (1980). As the authors indicate, "PIA is based on the assumption that a more responsive and useful evaluation will result by understanding both the policy context within which the evaluation is commissioned and also the questions being posed by actors within that context" (1980:3). "PIA is a six-step process designed to explicate the information requirements of key information users..." (Madey and Stenner, 1980:5). It builds upon two futures methodologies, the delphi technique and scenario writing. We will paraphrase the six-step process below, changing terms to make the description more applicable to knowledge utilization, while dropping the sixth step as it is inapplicable.

Step 1: Statements of hypothetical outcomes which may result from the use of the knowledge product are generated.

Step 2: Using these outcomes a written exercise is prepared for later use with a panel of stakeholders. The exercise is comprised on the following:

- hypothetical outcomes or "scenarios" with guidelines for responding to them.
- opportunity for stakeholders to generate their own favored outcomes with modification of and non-use of knowledge as open options.
- an evaluation of the exercise.

Step 3: A carefully selected panel of stakeholders is identified.

Step 4: Each panel member completes the exercise responding to the hypothetical outcomes in terms of the following:

- how likely he/she feels that the outcome will result from utilization of the knowledge.
- how he/she feels the outcome would impact upon him/herself or others.

Step 5: Responses of individuals are analyzed to:

- clarify the expectations of relevant stakeholder groups.
- delineate the context within which use of the knowledge product is embedded.

This process would appear to be a useful technique to surface user assumptions and it could be further adapted for such purposes. Yet it is not without its problems including its highly obtrusive character, the time required to carry it out, and the many practical problems surrounding panel selection. Yet despite these problems, such directed techniques should not be overlooked by utilization researchers in attempting to deal with the diversity problem.

3. The Multiattribute Problem: Research Review

While the diversity problem is concerned with the identification and measurement of individual standards for assessing knowledge individually considered, the multiattribute problem focuses on the interaction effects between/among different knowledge appraisal standards. The main point here is how knowledge appraisal standards interact with one another in decision making processes regarding the use of knowledge.

Realization of the multiattribute problem is conspicuously absent in the knowledge use and school improvement literature and while such a situation prohibits assessment of qualitative procedures applicable to this problem, it does not rule out our ability to propose suggestions for both conceptualization of the problem and appropriate methodological procedures pertinent thereto.

Again we turn to the notable work of Hall and his associates. Interestingly, their Stages of Concern about the innovation (SoC) component of the CBAM model has implications for conceptualization of the multiattribute problem. According to Hall et. al. (1979), innovation adopters (read: Knowledge users) go through a series of stage of concern (seven in all) about the innovation/knowledge. Concerns vary across a linear continuum; at first adopters/users are concerned about the impact of the innovation/knowledge on themselves and later they progress to a stage of concern for the impact of the innovation/knowledge on significant others in their environment. If we treat Hall's notion of concerns, which is defined broadly in any case, as inclusive of assumptions regarding use, truth, utility, relevance tests, this conceptualization suggests that these components likewise may be seen to interact in a developmental process.

A major problem with this conception is that it treats assumptions as attributes of an individual user - knowledge product analytical unit. And of course assumptions are shared entities. Thus attention to the shared character of assumptions and use processes in general should be reflected in conceptions employed by utilization researchers. If the Hall SoC concept had a collective dimension it might be more fruitfully applied to the multiattribute problem. Yet despite this shortcoming, the SoC concept may provide some useful insights for conceptualizing this problem (see Hall et. al., 1979).

C. Qualitative vs Quantitative Methodology: Toward a Rapprochement

The brief review of qualitative procedures employed in research on knowledge use and school improvement offered above suggests a number of conclusions. In the first place it is clear that mere use of conventional qualitative procedures is not synonymous with appreciation of the practically rational character of knowledge use activity. While many studies in the field employ an array of conventional qualitative techniques, few treat seriously the "everyday" character of knowledge production and use. In addition, the above review attests to the difficulty of systematically analyzing the use of qualitative methods. Such methods do not easily lend themselves to clear formalization or codification. This is not so much an artifact of the methods themselves, I think, as it is a matter of professional writing style. Qualitative researchers rarely elaborate systematically on the specifics of their research methods. Rather, almost apologetically, they identify them and proceed with the research findings. We desperately need a science of the systematics of method including qualitative methods to compliment the study of the systematics of theory that Merton has called for.

That this is so is doubtlessly the result of the particular scientific culture within which we find ourselves, one which prescribes the use of quantitative methods while deriding the use of qualitative procedures. Yet the battle over qualitative or quantitative methods obscures the reciprocal contributions which enlightened employment of both may provide. What is required in utilization studies and elsewhere is a strategy of multiple triangulation as proposed by Denzin (1970) (see also Jick, 1979). The combination of multiple observers, theories, methods, and data sources provides increased opportunities for the validation of social scientific findings. In addition to the significant accomplishment of cross-validation (see here Campbell, 1974) provided by triangulation, the cross-fertilization of qualitative and quantitative procedures results in a number of benefits at each stage of the research process (see Sieber, 1973; and, Madey, 1980; and Chart IV on following page).

Utilization researchers would do well to rise above the hackneyed hue and cry of the quantitative vs qualitative fracas and reap the valuable benefits of triangulation. Such a strategy would result in a noticeable improvement in the quality of utilization research and, one hopes ultimately, in the improvement of professional practice in the educational community and elsewhere.

Chart IV

Contributions of Qualitative Methods to Quantitative Methods

Design

Qualitative methods can enrich quantitative designs by improving:

(1) the sampling framework

(2) the overall study design

Data Collection

Qualitative methods can enrich quantitative data collection by improving:

(1) the instrument package

(2) instrumentation administration

Analysis

Qualitative methods can enrich quantitative analyses by providing:

(1) a conceptual framework to guide the analysis

(2) verification of quantitative findings

(3) index construction of quantitative analyses

(4) external validation

(5) case study illustration

(6) clarification of quantitative findings

Contributions of Quantitative Methods to Qualitative Methods

Design

Quantitative methods can enrich qualitative designs by identifying:

(1) representative cases, to serve the goal of generalizability

(2) unrepresentative cases, to refine models and theories

Data Collection

Quantitative methods can enrich qualitative data collection by providing:

(1) leads for later interviews and observations

(2) information about overlooked subjects

(3) correction of the "elite" bias

Analysis

Quantitative methods can contribute to the understanding of qualitative analyses by:

(1) correcting the holistic fallacy

(2) verifying qualitative interpretations

(3) casting new light on field observations

Exhibit 1. Summary of Benefits Obtained by Integrating Methods in Design, Data Collection, and Analysis

from MADEY, D. (1980) "Some benefits of integrating qualitative and quantitative methods in program evaluation, with illustrations." Educational Evaluation and Policy Analysis (forthcoming).

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V STUDYING KNOWLEDGE NETWORKS

William N. Dunn, Ralph Bangs,
and Hassan Rahmanian

Introduction
Basic Controls and Methods
Applications
Epistemic Network Analysis
Conclusions

ABSTRACT

The purpose of this paper is to explore potential applications of social network analysis to research on knowledge use and school improvement. The paper (1) outlines conceptual and methodological bases of social network analysis; (2) reviews some relevant past applications of social network analysis to the study of various facets of social structure and behavior; and (3) proposes and justifies the idea of "epistemic network analysis" as an appropriate and useful addition to research on social networks in general and to studies of knowledge use in particular.

INTRODUCTION

In this paper we explore potential applications of social network analysis to the study of knowledge use and school improvement. Our attention to social network analysis was prompted by a persistent problem encountered in conducting methodological research on knowledge use and school improvement. This problem, in its broadest terms, stems from the dearth of available procedures to map the frames of reference of stakeholders in school improvement such that we may reasonably claim that they belong to an identifiable "epistemic community" (see Holzner and Marx, 1979; Dunn and Holzner, 1981).

We are currently developing procedures to elicit and identify the frames of reference of individuals (see McIntyre, Fisher, and Dunn, 1981; Dukes and Dunn, 1981; Dunn and Dukes, 1981). Nevertheless, we also require an appropriate conceptual framework and methodology to characterize the frames of reference of collectivities. We believe that social network analysis provides a basis for developing one such conceptual framework and methodology.

The importance of devising appropriate procedures for studying knowledge use as a collective phenomenon is evident once we abandon individualistic and mechanistic assumptions about the role of knowledge in policymaking and professional practice. Individuals do not make binding policy decisions; they rather share decisional power and influence with multiple stakeholders whose divergent needs and interests create policies of great collective complexity (see Weiss and Bucuvalas, 1980). Under such conditions a narrow "problem-solving" image of knowledge use and school improvement is particularly inappropriate, misleading, and inapplicable (Cohen and Ganet, 1975). Moreover, knowledge is not "product-embodied," in the sense that particular research findings, technologies, or accumulated rules of successful practice (craft-knowledge) are mechanically "transferred" or "linked" to others. Knowledge is rather a social construction which is transacted by multiple stakeholders with different frames of reference.

Thus, "knowledge use" includes but goes beyond social interaction and exchange; it involves communicative actions between two or more stakeholders whose relation to one another, and to some educational innovation, is mediated by their respective frames of reference. Processes of knowledge use are therefore interpretive and interactive at once, such that "cognitive" and "social" dimensions of knowledge use may be separated analytically but not in practice (compare House, 1981). For this reason school improvement and other types of social reform are best viewed as "critical social transactions" among different stakeholders who together negotiate the adequacy, relevance, and cogency of knowledge claims (Dunn, 1981).

The major conclusion of this paper is that appropriate modifications and extensions of social network analysis will enable investigators to map the complexity of knowledge transactions. Specifically, by studying "knowledge networks" we can: (1) delineate epistemic communities whose key property is the sharing of a common frame of reference towards knowledge use and school improvement; (2) monitor changes in the frames of reference of epistemic communities; and (3) discover relationships between patterned social interactions (social structures) and changes in the frames of references and boundaries of epistemic communities.

In arguing towards this conclusion this paper first outlines conceptual and methodological bases of social network analysis, including theoretical perspectives that originate in functionalism and exchange theory and methods of procedure that lie in the tradition of sociometry. The second part of the paper reviews relevant past applications of social network analysis in several domains including energy policy, corporate ownership and control, community power structure, and the diffusion of innovations. Finally, the paper proposes and justifies the idea of "epistemic network analysis" as an appropriate and useful addition to research on social networks in general and to studies of knowledge use in particular.

BASIC CONCEPTS AND METHODS

In its most basic and general form a social network may be defined as "a specific set of linkages among a defined set of persons with the additional property that the characteristics of these linkages as a whole may be used to interpret the social behavior of the persons involved" (Mitchell, 1969). This definition, which focuses on linkages among persons, may be extended to include collectivities. Thus, Lauman and Pappi (1976) define a social network as "a set of nodes (e.g., persons) linked by a set of social relationships of a specified type." This definition, since it is generalizable to any and all units of analysis (individuals, dyads, eliques, elites, groups, organizations, communities), permits us to study collective properties of knowledge properties and use. Moreover, this definition stipulates that diverse social relationships, and not linkages per se, characterize the interactions among individual and collective actors. These diverse social relationships are not confined to observable exchanges of goods, services, or information but extend to beliefs, values, and assumptions as well.

Social network analysis originates in two important but disparate streams of theorizing about social phenomena. The first, represented by structural sociology, is exemplified by theories of exchange structuralism, functional structuralism, and conflict structuralism (see Wallace, 1970). Here network analysis has been employed to model those sets of components, interactions, and relationships which together constitute "social structure." For example, network analysis has been used both to operationalize and develop structural-functionalism (Lauman and Pappi, 1976; McCord, 1980).

A second stream of theorizing which underlies network analysis is mathematical (see, e.g., Harary et al., 1965). Here we find the use of both geometric and algebraic models to represent social relationships. Graph theory, as a combination of geometric and algebraic concepts and operations, provides one of the foundations of network analysis. Graph theory not only permits us to represent social networks in the form of directed and undirected graphs; it also enables the translation of graphic representations into matrix form in order to perform algebraic operations. Following graph theory, network analysis also permits the assignment of values to loops and lines.

There are two basic types of networks: systems networks and system-state networks (see Heckathorn, 1979). Systems networks focus on structure and potential social relationships, while system-state networks deal with process and actual social relationships. For example, a systems network might assume the specific form of a professional teachers association whose structural properties and potential for change may be described in general. By contrast, a system-state network might be found in the form of a teachers' union engaged in processes of bargaining and conflict with district school administrators. Formally, a systems network may be defined as a set of nodes (e.g., teachers) connected by arcs representing the potential transfer of a valued or disvalued good or service (e.g., curricular materials). A system-state network, by contrast, represents an actual rather than potential transfer. For example, while curricular materials are potentially transferrable among teachers the actual transfer of such "goods" may be highly segmented. The concepts of systems network and system-state network are useful in characterizing properties of different social structures.

Properties of social structures may also be investigated with blockmodeling, a set of techniques based upon network procedures (see Lauman and Pappi, 1976; Light and Mullins, 1979). Blockmodeling, first introduced in the mid-1970s (White _et al_., 1976), enables investigators to partition units of a social system into "structurally equivalent" subgroups (blocks) that are based on patterned social relationships. A blockmodel analysis usually begins with a set of k sociomatrices that represents the patterns formed by k different kinds of ties among n people or units. The units, if they are not persons, may be stakeholder groups, organizations, or communities. The resultant set of blocks may be viewed as representing the range of social roles, positions, or statuses present in a system. Thus, blockmodeling partitions a population into subgroups (blocks) while preserving the totality of the system.

Many concepts and procedures of network analysis are essentially static since they represent structural properties of social systems at single points in time. In response to this limitation Holland and Leinhardt (1977) have a developed dynamic network model. This model uses continuous-time Markov processes to depict structural change, with structure "conceptualized as influencing or constraining individual behavior through its effect on the probability that a given link (or non-link) between two individuals will change over time." The dynamic model views structural change as continuous, thus avoiding distortions that arise when networks are investigated at discrete moments.

The first step in conducting a network analysis is to specify appropriate individual and/or collective units of analysis. The second step is selecting an appropriate sampling procedure, including forms of non-probability sampling that depart from or modify the equal-probability-of-selection method (EPSEM). For example, network analysis may require interviews with all eligible respondents in a system, or a sample of class of such systems, rather than a standard random sample of scattered individuals in a large population (Rogers, 1979). The choice of a sampling procedure depends both upon the unit of analysis (individual vs. collective) and the underlying theories (cognitive vs. behavioral) employed to specify and explain social relationships. Sampling procedures may assume a number of different forms that modify or depart entirely from assumptions of probability sampling (see Kish, 1965). These modifications or departures include theoretical sampling (Glaser and Strauss, 1967), sociometric sampling (Sudman, 1976), stakeholder sampling (Dunn, Mitroff, and Deutsch, 1981), and sampling procedures oriented towards the selection of issues, events, or phases in the process of planned change and knowledge use (Dunn and Holzner, 1981).

Thus far, network analysis has relied primarily on data obtained from responses to sociometric questions included in self-administered questionnaires and interview schedules. Sociometric questions may focus on how individuals feel towards one another (Hunter, 1978), who meets whom about what on a regular basis (Zijlstra, 1979), or the sources of information leading to the adoption of innovations (Rogers, 1979). The choice of particular types of questions implies the selection of appropriate measures and measurement criteria. Examples include the amount of communication, as measured by the length of time and number of actors involved; the perceived importance and content of communication; frequency, content, and intensity of interaction; and cognitive, affective, or ideological distance.

The reliability and validity of sociometrically based network studies have been questioned by several commentators. For example, Kilworth (1976) and Bernard (1977) have cautioned that four considerations must be taken into account if we are to assess the error within instruments used to collect sociometric or network data: reliability, validity, veridicality, and accuracy. In this context there is some evidence that cognitive data are inaccurate about 50 percent of the time and, for this reason, cannot be used to represent social structure and behavior (Bernard, Killworth, and Sailer, 1979). One solution for this problem is to employ naturalistic observation, as opposed to cognitive data, to describe behavior. Another solution is to increase the veridicality of cognitive data by employing various qualitative procedures (see McIntyre, Fisher, and Dunn, 1981), including instruments that have proved effective in other contexts of practice (e.g., marketing) as means for uncovering personal constructs and assumptions (see Frost and Braine, 1967; Dunn and Dukes, 1981). Finally, it should be noted that standard reliability and validity issues may be somewhat beside the point if we begin from the assumption the cognitive data are idiographic and dynamic, thus rendering standard psychometric validation procedures (e.g., internal consistency and test-retest reliability) in appropriate and inapplicable (see Kelly, 1955).

APPLICATIONS

Network analysis has been applied in a variety of contexts. Applications of network techniques, as Holland and Leinhardt (1979) observe, have ranged from studies of attitude formation and communications to research on social mobility, interpersonal and political behavior, corporate and community organization, and the diffusion of innovations.

Some of the most successful applications of network analysis have been in the area of research on the diffusion of innovations. Whereas the bulk of existing research on innovation, planned change, and knowledge use focuses on individuals, network analysis offers possibilities for studying the relational, transactional, and collective properties of knowledge creation, transfer, and use (see Lazarsfeld, Pasanella, and Rosenberg, 1972: Section III; Coleman, Katz, and Menzel, 1957; Coleman, 1958-59; Rogers, 1979). The relational, transactional, and collective aspects of social systems are critical to the diffusion of new ideas, products, and practices as well as to the utilization of knowledge in general.

An instructive early example of network analysis is Coleman, Katz, and Menzel (1957), a study of the social processes affecting the adoption of a new drug by physicians. Doctors in four communities were interviewed, using sociometric questions, and grouped into seven subgroups (cliques). In Coleman's words:

> The question, then, became this: At each point in time after the drug was marketed, were cliques homogeneous or not in their members' use or nonuse of the drug? If they were homogeneous, then this was evidence that some kind of social influence or diffusion was going on in relation to the measured sociometric ties. If not, this indicated that the cliques delineated on the basis of questions in the interview had little relevance to drug adoption (Coleman, 1958-59:33).

In monitoring the adoption process over a 15-month period Coleman and colleagues found that there was no subgroup homogeneity until around 7 months after the drug was introduced, a time at which some 50 percent of individual doctors had adopted the drug. The maximum homogeneity was reached at about 11 months, a time at which some 76 percent of the doctors had adopted the drug. At the end of the 15-month period 86 percent of doctors had adopted the drug, yet the homogeneity of cliques had returned to zero. The major conclusions inferred from these results are that social networks are effective media for diffusing innovations at certain times, but not at others, and that social network analysis is a powerful method for delineating the changing boundaries of collectivities whose individual members are engaged in knowledge transactions.

In another more recent application of network analysis to the study of innovation Burt (1980) has argued that the act of adopting an innovation reflects a particular type of structural interest. For a potential adopter the perceived utility of an innovation is as much a function of his relationship with other potential adopters (i.e., his links to a particular social structure) as it is a consequence of external material properties of an innovation, or what Caplan _et_ _al_. (1975) term "knowledge-specific" characteristics. In the case of medical innovations Burt suggests that a doctor's prescribing a new drug is not merely a function of his personal characteristics, but also a consequence of his position in a social network. This conclusion reinforces findings in other contexts, including mental health, that social relationships based on interpersonal trust are associated with the utilization of evaluation research (see Patton et al., 1977).

Network analysis also provides a basis for examining the structural relations and interactions among actors involved in different phases of the policy-making process. By focusing on interorganizational communications we can assess the contribution and influence of each policy actor (Zijlstra, 1978-1979), an approach that yields information about networks of interlocking directorates (Zijlstra, 1978-1979; Levine and Roy, 1979). This type of network analysis provides information about representation and control, information access and exchange, and negotiation, coordination, and harmonization of interests. Thus far, interlocking directorates have been studied in contexts of nuclear energy policy in the Netherlands and decision making among major corporations in the United States.

EPISTEMIC NETWORK ANALYSIS

A major aim of current and future research projects is to develop appropriate methodologies for analyzing knowledge transactions among a diverse set of stakeholders in school improvement. Knowledge transactions, which represent one type of social interaction, may be represented in terms both of structure and process. Thus, for example, we can speak of the cognitive structure of epistemic communities, a structure constituted by patterns of express and tacit commitments to particular tests for assessing the adequacy, relevance, and cogency of knowledge claims (Dunn and Holzner, 1981).

We can also investigate the social processes that lead to the creation, maintenance, and transformation of the cognitive structures of epistemic communities. In focusing on such structures and processes we employ argument as a unifying construct that encompasses social as well as cognitive properties of social interaction (Dunn, 1981). In using argument as a model of knowledge production and use we assume that the structure of epistemic communities is a product of natural social comparison processes which may be investigated empirically. Arguments, as Willard observes, are

> naturally occurring corollaries to research contexts.... It is rather as if we were to stand back and watch while our subjects framed their own hypotheses, selected methodological principles, utilized techniques appropriate to both, and conducted their own research act...arguments give us more information than other kinds of research (Willard, 1980:9-10).

The structural model of argument developed by Toulmin (1958) provides a useful framework for investigating knowledge transactions. Knowledge transactions affect and in turn are affected by the frames of reference of individual and collective stakeholders. In order to deal with the complexity of knowledge transactions and their effects on the production and use of knowledge in contexts of educational practice it is necessary to characterize and bound the cognitive maps of stakeholders. Given that network analysis may be readily adapted to problems of cognitive mapping (Heckathorn, 1979), what is needed is a kind of "epistemic network analysis."

Epistemic network analysis, as the term suggests, begins with the idea of "epistemic community" as a focal point. An epistemic community, translated into network terms, may be defined as a set of nodes, represented by collective and individual actors, linked by a set of social relationships that are based on the acceptance of a common frame of reference. A frame of reference may be defined as a particular configuration of explicit and implicit standards for affirming or challenging the adequacy, relevance, and cogency of knowledge claims, whether "scientific" or "ordinary" in origin (cp. Lindblom and Cohen, 1979).

In studying epistemic or knowledge networks we may transform and extend the structural model of argument to represent major elements of social discourse and debate. Specifically, new ideas, practices, or products constitute data (D) on the basis of which educational stakeholders offer knowledge claims (C). Knowledge claims may be definitive ("Standardized achievement tests are objective"), designative ("The socioeconomic status of students governs their educational achievement"), evaluative ("Instructional television is bad for children"), or advocative ("School districts should adopt busing as a means to integrate schools").

The structural model of argument provides that data (D) are transformed into claims (C) via warrants (W) and backings (B) for warrants. Warrants answer the question "Why does a knowledge claim follow from the data supplied?" by providing plausible reasons. For example, "Since District A is essentially similar to District B" (W), and "District B achieved racial balance through busing" (D), then "District A should adopt busing as a means to integrate schools" (C). A backing (B) for the warrant described above answers the question of why we should accept the warrant. In the example just offered the backing (B) might be "Because District A and District B have similar ethnic and socioeconomic profiles." The backing (B) and warrant (W) for a claim constitute part of what is typically meant by the term "frame of reference" (Dunn and Holzner, 1981).

The last key element in the structural model is the rebuttal (R).* The rebuttal is a counterclaim, counterwarrant, or counterbacking offered to dispute or challenge another stakeholder. In effect, the rebuttal establishes the _social_ character of an argument, since all knowledge claimants are linked to counterclaimants in a network or field of discourse and debate. By definition, then, argument is a social comparison process involving claims and counterclaims about the adequacy, relevance, and cogency of new educational ideas, practices, and products.

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*For purposes of exposition we have omitted Toulmin's qualifier (Q), which expresses the relative force or plausibility of a claim. The qualifier may be used to operationalize the concept of "cogency test" (see Dunn, 1981).

The above discussion suggests two major types of epistemic networks: manifest and latent. Manifest networks are composed of claims and counterclaims, that is, overt and publicly available statements about the nature, consequences, value, or action-implications of an innovation. These claims and counterclaims are similar to responses in public opinion surveys. At another more profound level are networks of warrants and backings that together constitute frames of reference. These latent networks embody the unspoken or hidden standards of assessment operative in affirming or contesting knowledge claims.

Epistemic network analysis may be used to monitor changes or transformations in manifest or latent networks. Two available methods for monitoring such transformations were noted in the first section of this paper. One method focuses on a temporally ordered system state newtork, while the other operationalizes network dynamics as a Markov chain. Although transformations in manifest and latent networks may be continuous or discontinuous (as in "catastrophe theory"), it is reasonable to represent changes by comparing manifest and latent system states at different points in time. In this way we may uncover those elusive properties of "collective learning" and "knowledge synthesis" that are so critical to research on knowledge use and public policy (see Etheredge, 1979; Holzner, 1979; Rich, 1981).

In discussing the structure of epistemic networks we have thus far avoided any discussion of social interaction. Clearly, epistemic networks are based both on social interaction among occupants of different social roles (e.g., parents, teachers, principals, superintendents) as well as the negotiation and acceptance of particular frames of reference. Yet the investigation of "social" and "cognitive" properties of epistemic networks requires different procedures. Thus, for example, social positions or roles may be sampled randomly or enumerated, while frames of reference require theoretical, purposive, or snowball sampling designs. Similarly, social interaction may be investigated with standard sociometric instruments that focus, for example, on the type, frequency, and intensity of interaction. By contrast, the discovery of latent (but not manifest) epistemic networks requires depth interviews to elicit underlying standards for assessing the adequacy, relevance, and cogency of knowledge claims.

These contrasting methodological requirements punctuate the importance of concurrently studying social and cognitive properties of epistemic networks. Procedures for studying social interaction, as well as what we have called manifest networks, are reasonably well developed in available research. Procedures for studying "cognitive maps," "paradigms," "frames of reference," and other latent structures are much less readily available (see Dunn and Dukes, 1981). Needed are research methods that effectively surface tests of knowledge adequacy, relevance, and cogency and appropriate conceptual frameworks to order, differentiate, and label these varied components of frames of reference.

CONCLUSIONS

This paper has described basic concepts and procedures of social network analysis, reviewed several past applications, and proposed and justified the idea of "epistemic network analysis." Our major purpose has been to sketch the contours of an approach that extends and modifies network analysis in ways that permit the systematic study of epistemic communities. Epistemic network analysis, by focusing on manifest and latent knowledge structures, can assist in further operationalizing the concept of frame of reference, establishing on empirical grounds the boundaries of epistemic communities, monitoring changes in the manifest and latent knowledge structures, and describing relations between the dynamics of social interaction and changes in individual and collective frames of reference. Epistemic network analysis may even permit systematic investigations of collective learning and knowledge synthesis, processes that so far have eluded most students of knowledge use and professional practice.

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VI MULTIATTRIBUTE PROCEDURES FOR STUDYING ADOPTION DECISION MAKING

William N. Dunn and Mary Jo Dukes

Introduction
The Multiattribute Problem
Types of Multiattribute Procedures
Selection of Attributes
  --Stimulus-Imposed
  --Response-Imposed
  --Stimulus and Response-Imposed
Explanation of Judgments
Unit of Analysis
The Judgment Process
Conclusions

ABSTRACT

A major problem in decisions to adopt an educational innovation, whether as an individual or as a committee member acting on behalf of a larger unit, is how to assess the innovations available. This paper suggests that the choice of a subset of usable measures of assessment is a multiattribute problem, that is, a problem where the selection of an appropriate subset depends on the subjective standards of assessment applied by the stakeholders who attribute different properties to the innovation; compares and contrasts multiattribute procedures according to several key dimensions, including the mode, scope, ground, and focus of procedures for selecting assessment measures; and evaluates these procedures in terms both of their general appropriateness to complex problems of choice and their applicability to the specific problem of selecting a subset of maximally usable measures to assess the potential of the innovation.

INTRODUCTION

In this paper we explore the potential applications of multiattribute decision theory to knowledge use and school improvement. The decision to use, adapt or reject an innovation is a complex phenomenon. One of the primary reasons for this complexity is that knowledge use is fundamentally interpretive. In assessing the utility of an innovation, individuals, depending upon their frame of reference, attribute different properties or attributes to different innovations. The various attributes are not usually weighted equally in importance by all stakeholders.

This paper assumes that a judgment regarding the utility of an educational innovation is best viewed as a multiattribute problem--that is, a problem where the overall assessment of the utility of an innovation depends on the subjective standards of assessment or decision rules used by stakeholders who attribute different properties to educational innovations. This and similar multiattribute problems are the focus of an extensive and highly diversified literature that may be characterized by the term multiattribute decision theory. Nevertheless, it should be recognized that this umbrella term includes approaches, models, and procedures that differ fundamentally in their aims, assumptions, and contexts of application. Thus, for example, while evaluation researchers generally equate multiattribute procedures with the work of Keeney (1975), Keeney and Raiffa (1976), and Edwards, Guttentag, and Snapper (1975), this particular variant of multiattribute decision theory is an extension of axomatic utility theory (see von Neumann and Morgenstern, 1947) that has little in common with other forms of multiattribute decision theory. These other forms of multiattribute decision theory include social judgment theory (Hammond, 1965), conjoint measurement (Krantz and Tversky, 1971), functional measurement (Anderson, 1970), analytic hierarchy analysis (Saaty, 1980), multidimensional scaling (Kurskal and Wish, 1978), strategic assumptional analysis (Mitroff, Emshoff, and Kilmann, 1979), and dialectical performance assessment (Dunn, Mitroff, and Deutsch, 1981).

We thus use the term multiattribute decision theory as a broad methodological construct that includes many diverse procedures. We have deliberately assumed a flexible multidisciplinary posture towards these procedures since we believe that the discipline and research traditions with which they are associated often create artificial boundaries that limit potential applications to evaluation research, knowledge use, innovation adoption, and other areas of policy research. Our aim is to select elements of these various multiattribute procedures on the basis of their potential contribution to understanding judgments regarding the utility of innovations rather than their conformity to the research traditions from which they arose. To borrow and adapt the well-known contrast between "trapped" and "experimental" administrators (Campbell, 1975), we view our task as one of advocating procedures on the basis of the severity of the problem rather than the certainty that any one procedure will yield conclusive and final results. We thus see our role as experimental methodologists, in the widest sense of the term, rather than trapped ones.

The purpose of this working paper is threefold. First, we present the general case for viewing educational innovation assessment as a multiattribute problem. In making this case we rely on analogies to marketing, a field of research and practice whose aims, assumptions, and problems bear a close resemblance to those encountered in the development, testing, and diffusion of educational innovations. Second, we compare and contrast multiattribute procedures according to several dimensions that are of critical importance in identifying a subset of criteria used to assess the utility of educational innovations. By considering these dimensions--which include the mode, scope, ground, and focus of procedures for analyzing judgments of the utility of educational innovations--we are able to address key methodological and practical issues and avoid surface technical disputes, for example, how best to estimate the shapes of utility functions or whether to use full or partial factorial designs. Finally, we evaluate these procedures in terms both of their general appropriateness to ill-structured problems of choice and their applicability to the specific problem at hand--that is, identifying a subset of innovation attributes used to assess educational innovations and determining the relative importance of the innovation attributes with regard to judgments of the overall utility of innovations.

THE MULTIATTRIBUTE PROBLEM

Identifying innovation attributes and determining how these attributes are combined to arrive at a judgment of the utility of the innovation is a multiattribute problem. By this we mean that understanding judgments regarding the usefulness of an educational innovation depends on our capacity to uncover and model the subjective standards of assessment or decision rules employed by stakeholders who attribute conflicting properties to educational innovations. Some of the most relevant characterizations of this problem come from fields of marketing (e.g., Green and Wind, 1973), information processing (e.g., Slovic and Lichtenstein, 1971), and management information systems (e.g., Larck[illegible]nd Lessig, 1980), where problems of assessing the usability of products and processes are highly dependent on our understanding of the subjective judgments of consumers and users.

This same problem, at least in its most general form, is also the primary concern of that branch of research utilization that is based on an extension and adaptation of the classical sociology of knowledge (Holzner and Marx, 1979). Here we find that the classical sociology of knowledge, with its emphasis on the social determinants of intellectual formations, is "turned upside down" and thereby transformed into a social science of knowledge applications (Weiss and Bucuvalas, 1980). The central unifying construct of a social science of knowledge applications is the idea of "frame of reference" (Holzner and Fisher, 1979), a construct that denotes systematically organized sets of underlying principles, rules, or tests that shape decisions to accept, reject, or modify products and processes of applied social research. Dunn (1981) has developed a preliminary classification of such tests and proposed, in contrast to Campbell and Stanley (1963), a series of threats to the adequacy, relevance, and cogency of usable knowledge.

In viewing judgments about the utility of educational innovations as a multiattribute problem we assume that the dimensions of the innovation, can be described in terms of states or levels of attributes that originate in the underlying assumptions of stakeholders. As Green and Wind observe, attributes are

> mental percepts and may or may not be related to objective characteristics of the object. The attributes that are evoked are assumed to be related to the decision maker's knowledge of and experience with the objects and the characteristics of his specific problem-solving situation (Green and Wind, 1973:14).

In assessing the utility of educational innovations and other areas, attributes may be structural (e.g., teacher feedback system), functional (e.g., the extent to which the innovation will increase the attainment of desired outcomes), psychological (e.g., how the innovation may affect professional self-image), social (e.g., the status conferred on the school through adoption of an innovation), or economic (e.g., the financial costs of implementing and maintaining a particular innovation).

For present purposes we can formally represent objects of judgment--whether these be approaches to outcome measures or constituent concepts, strategies or processes--as discrete alternatives whose selection is related to judgments about the usability of an innovation in specific contexts of use. Any alternative, X, may be represented as the ordered m-tuple

$$X = (x_1, x_2, x_3, \ldots x_m) \qquad (1)$$

where X is the alternative and $x_1, x_2, x_3, \ldots x_m$ refer to the state or level of the j-th attribute (j = 1, 2, 3, ... n). If we are dealing with an attribute state (e.g., [a curriculum constraint specifying basic skills or subject area requirements])the attribute is an unordered dichotomy or polytomy that may be coded in terms of p-1 dummy variables, where p is the number of unordered (nominal) categories. If we are dealing with an attribute level (e.g., the perceived decisional relevance of an instructional or management strategy or the dollar costs of implementing the innovation) the attribute is a continuous variable that may have properties of ordinal, interval, or ratio scales. Assuming that a given stakeholder assesses the usability of some innovation as greater than others we can represent his usability function as

$$U(X) = f(x_1, x_2, x_3, \ldots x_m) \qquad (2)$$

where U(X) is the usability (utility, value, worth) of the X-th alternative and $x_1, x_2, x_3, \ldots x_m$ are states or levels of attributes that constitute a usability function. Usability functions may be linear or configural, additive or multiplicative.

The primary aim of investigating judgments of the utility of educational innovations as a multiattribute problem is to construct models of stakeholders' usability functions that satisfactorily account for their choice of concepts, strategies, processes, and outcome measures. If the plausibility of such models can be established through experimental research we might also predict the subsequent behavior of stakeholders in using information supplied with particular innovations. Thus, for example, it would be useful to know the underlying subjective basis (usability function) according to which an educational stakeholder might weight and combine attributes in order to choose among the three types of innovations described in Table 1.

Table 1

ATTRIBUTES OF THREE INNOVATIONS
DESIGNED TO
INCREASE BASIC SKILL ACQUISITION

	Attribute			
	(1)	(2)	(3)	(4)
Innovation	Level of Effort Required	Goal Attainment	Motivational Relevance	Cost per School
Curricular	6	5	2	$800
Instructional	1	3	5	$200
Management	4	1	2	$300

NOTE: Columns (1)-(3) represent arbitrary subjective judgments on a scale ranging from 1 to 10. Column (4) contains hypothetical data that are, in principle, objectively calculable.

In the above illustration innovations and their attributes have been simplified for purposes of exposition. Any reasonably complex multiattribute problem will raise at least four key methodological issues not addressed in this illustration:

(1) Selection of Attributes: What procedures are available to select attributes such as those listed in Table 1? Is this attribute-space, composed of four elements, smaller or larger than that of given stakeholder (e.g., teachers, principals, students, parents, etc.)? To what extent do these four attributes correspond to the real but unknown decision rules used by stakeholders to assess the usability of educational innovations? These and related questions point to major differences in the methodological grounds used to select attributes. Generally, these grounds involve attributes that are researcher-imposed or user-generated.

(2) Explanation of Judgments: On what basis are judgments or choices among alternatives explained? Do regression models that estimate choices on the basis of linear (or non-linear) combinations of weighted attributes provide an adequate basis for explaining choices among innovation alternatives? Do efforts to establish the goodness-of-fit between regression equations and preestablished formal utility functions and axioms provide adequate explanations of choice? These questions accentuate differences in the theoretical focus of multiattribute procedures. Generally, multiattribute procedures are assumption-focused or calibration-focused.

(3) Unit of Analysis: Do individuals or groups constitute the unit of analysis when applying multiattribute procedures? When individual stakeholders are the unit of analysis can we properly aggregate or average their judgments to represent a "collective" choice? When groups are the unit of analysis can we describe authentically collective judgment processes, rather than aggregative ones? These questions point to differences in the scope of involvement in multiattribute decisions. Generally, multiattribute procedures involve segmented or comprehensive involvement.

(4) Judgment Process: Do individual or group stakeholders make judgments on the basis of their knowledge and experience alone? Or do such stakeholders augment and check their own judgments against those of others? These questions call attention to the mode of judgment used to make multiattribute decisions. Mode of judgment has two general forms that are active and interactive.

Most judgments regarding the utility of innovations in the field of education are complex and ill-structured (Dunn and Mitroff, 1980; Dunn, Mitroff, and Deutsch, 1981). Consequently, the above issues must be addressed in attempts to devise and apply appropriate multiattribute procedures. As we shall see in the next section these issues are addressed in different ways by multiattribute procedures that may be compared and contrasted in terms of the methodological grounds used to select attributes, the theoretical focus of explanations, the scope of involvement in multiattribute decisions, and the mode of making judgments about innovations.

TYPES OF MULTIATTRIBUTE PROCEDURES

In this section we describe six types of multiattribute procedures that may be employed to model judgments of the utility of educational innovations. These six types are: multiattribute utility analysis (MAUT), analytic hierarchy process (AHP), conjoint analysis (CONJOINT), functional measurement (FM), social judgment analysis (SJA), and the dialectical performance assessment technique (DIAPAT). The latter procedure was expressly developed for purposes of developing improved performance measures in criminal justice but would apply equally well to decisions regarding educational innovation adoption, (Dunn, Mitroff, and Deutsch, 1981).

The procedure followed in this section is to address sequentially each of the four issues identified in the last section--selection of attributes, explanation of judgments, choice of unit of analysis, and selection of a judgment process--by comparing and contrasting the six multiattribute procedures as a set. In other words, we compare and contrast procedures on an issue-by-issue basis, a procedure that maintains a focus on key methodological issues without permitting us to drift into unnecessarily detailed and lengthy technical discussions that are available in references appended to this working paper. In addressing these four issues we will also apply for purposes of differentiating the six procedures the four dichotomous methodological properties specified above — that is, imposed vs. generated attributes, assumption- vs. calibration-focused explanations, segmental vs. comprehensive involvement, and active vs. interactive judgment. These dichotomous properties represent our own judgments about relevant attributes and are tied, respectively, to problems of establishing the methodological grounds, theoretical focus, scope of involvement, and mode of judgment of multiattribute procedures. These methodological issues, problems, and related properties are summarized in Table 2.

Table 2

ISSUES, PROBLEMS, AND PROPERTIES
OF MULTIATTRIBUTE PROCEDURES

Issue	Problem	Property
SELECTION OF ATTRIBUTES	Establish plausible methodological grounds for selecting attributes	User-generated vs. researcher-imposed attributes
EXPLANATION OF JUDGMENTS	Establish plausible theoretical basis for explaining variations in judgments	Assumption-focused vs. calibration-focused explanations
UNIT OF ANALYSIS	Establish plausible basis for delineating scope of involvement in multiattribute decisions	Segmented vs. comprehensive involvement
JUDGMENT PROCESS	Establish plausible basis for representing judgment process	Active vs. interactive judgment

Selection of Attributes

The problem of establishing plausible methodological grounds for selecting attributes is perhaps the key issue in applying multiattribute procedures. In every standard application of multiattribute procedures of which we are aware attributes are imposed by the researcher in one of three major ways:

1. Stimulus-Imposed: Here the researcher selects, on a priori, judgmental, or intuitive grounds, a set of attributes that are incorporated into standard experimental stimuli (pictures of products, brand names, vignettes, scenarios, etc.). In conjoint analysis (Krantz and Tversky, 1971), for example, multilevel factorial designs are used to represent various levels of attributes believed to characterize a particular object of judgment. Attributes incorporated in standard stimuli are then used as a basis for inferring that particular configurations of underlying attributes are responsible for patterns of choice among objects.
2. Response-Imposed: The researcher again selects attributes on a priori, judgmental, or intuitive grounds. But here the imposed attributes are incorporated into response routines (e.g., ranking procedures or Likert-scales) used to elicit the subject's judgments. In studies of research utilization in mental health Weiss and Bucuvalas (1980), influenced in part by multiattribute utility analysis (Keeney, 1975), use response-imposed attributes whose levels are expressed in five-point Likert-scales, together with randomized standard stimuli in the form of research abstracts. Attributes incorporated in response scales are then judged by subjects and reduced through factor analysis to sets of factors that confirm or modify original assumptions about the underlying attribute structure of respondents.

3. Stimulus and Response-Imposed: Here attributes are again imposed on a priori, judgmental, or intuitive grounds. But states of levels of attributes are incorporated both in standard stimuli (pictures, flash cards, computer graphics) and in response routines that typically require subjects to rank and weight the importance of predefined attributes that are assumed to be related to standard stimuli. Social judgment analysis (Adelman, Stewart, and Hammond, 1975) uses stimulus- and response-imposed attributes in the form of predefined standard stimuli (e.g., descriptions of different types of educational research centers) and response routines requiring that stimuli be ranked and evaluated in terms of the importance of predefined attributes (e.g., scope of change required in implementation of the innovation) to these stimuli. Multiattribute utility analysis (Edwards, Guttentag, and Snapper, 1975), while different in most other respects, also uses stimulus- and response-imposed attributes.

The imposition of attributes by researchers may seem an efficient or even necessary procedure, given the difficulties of eliciting mental constructs from respondents. If one assumes that the use of indirect procedures for inferring attributes is inevitable, then multiattribute procedures such as those derived from integration theory (Anderson, 1974) and incorporated as a general heuristic into functional measurement routines (e.g., Meyer, Levin, and Louviere, 1981) will suffice. Moreover, if one assumes that particular axioms of choice adequately characterize the underlying utility functions of subjects (e.g., Keeney, 1975), one can then proceed to establish the goodness-of-fit between derived axiomatic functions and patterns of responses to stimuli. Finally, one can begin from the assumption that all persons have innate feelings on the basis of which they can make consistent judgments that approximate external reality (Saaty, 1980). The problem then is to obtain better estimates of that reality by developing an appropriate mathematical theory for scaling judgments that permits us to discriminate between feelings, establish their consistency with scale-values, and reproduce results on repeated occasions (Saaty, 1980:7).

The weakness of these procedures is that they ignore available techniques for identifying attributes. Techniques for identifying attributes may be classified according to their degree of structure (Hughes, 1971). Relatively unstructured techniques include in-depth interviews and projective tests, while relatively structured techniques include standardized questionnaires and statistical procedures associated, for example, with Coombs' unfolding theory and Lazarsfeld's latent structure analysis (see Coombs, 1953). Partially structured techniques, to be discussed below, include reason analysis (Lazarsfeld, 1935) and Kelly's Repertory Grid (Kelly, 1955). As we move from relatively unstructured to relatively structured techniques we also move along a continuum from user-generated to researcher-imposed attributes. As already noted, the majority of multiattribute procedures impose attributes by using relatively structured techniques.

Relatively Unstructured Techniques. Unstructured procedures for identifying innovation attributes are primarily exploratory in nature, since the content and direction of responses are determined by the respondent and not by the interviewer. The majority of these procedures have been borrowed and adapted from psychology (Collins and Montgomery, 1970). Relatively unstructured techniques can be used with individuals or groups as the units of analysis.

Depth interviews, which take the individual as the unit of analysis, are conducted by trained interviewers who probe respondents' thoughts regarding the use or appropriateness of an educational innovation or other object of judgment. Depth interviews are unstructured and exploratory in the sense that the course of the interview is not determined a priori by the interests of the interviewer. The depth interview, however, is not completely unstructured. All interviewers provide some type of feedback to the respondent. This feedback tends to selectively reinforce certain kinds of responses and not others.

Projective techniques also begin with the individual as the unit of analysis. Projective techniques involve the use of incomplete or vaguely defined stimuli which the respondent is required to complete. It is assumed that in the process of interpreting and completing the ambiguous stimulus material attributes are revealed which could not have been drawn out through the use of direct questions, because attributes are unconscious and cannot be verbalized. A projective technique which may be potentially useful in eliciting important innovation attributes is the sentence completion test. This test has been used frequently in marketing research (Hughes, 1971). Completion techniques involve the presentation of an incomplete stimulus (e.g., sentence), with instructions that the respondent complete it any way he wishes.

Brainstorming, which begins with the group as the unit of analysis, is a type of group discussion which attempts to increase the involvement of individuals; the amount of interaction within the group; reduce inhibitions; and encourage creative thinking (Sampson, 1970). Synectics, also used with groups, is a technique for directing creative potential for the solution of problems (Gordon, 1961). Synectics is a Greek word which means the joining together of different and seemingly irrelevant items. This technique is based on the assumption that the psychological processes and mechanisms which take place in the creative process are usually unconscious. The synectics group situation, which encourages each respondent to verbalize his thoughts about an object or a particular problem, can surface assumptions so that they can be identified and analyzed (Sampson, 1970).

Structured Techniques. Structured techniques usually make use of statistical methods for identification of important attributes. Three techniques which can be used for determining important innovation attributes include factor analysis, cluster analysis and non-metric multidimensional scaling.

Factor analysis involves reducing a large number of attitude dimensions to a few factors with minimal loss of information (for a technical discussion, see Nunnally, 1967). There are at least three ways that factor analysis may be useful in identifying important innovation attributes. They are:

1. Separation and analysis of distinct dimensions that are latent in a larger set of innovation attributes
2. Separation and analysis of distinctly different groups of stakeholders which exist in a larger population.
3. Identification of certain likely attributes for subsequent multiattribute decision theory models (e.g., policy capturing) from a much larger set of potential attributes (Massey, 1964:p. 242).

One of the major weaknesses of factor analysis is that the researcher is required to interpret and label the factors once the technique has reduced the data.

Cluster analysis is a method for classifying objects. This technique focuses on the objects by classifying together those stakeholders whose judgments or evaluations are similar along several dimensions (for a more complete discussion, see Green and Tull, 1970). As with any classification scheme, cluster analysis tries to maximize the homogeneity within clusters and the heterogeneity between the groups. The purpose of cluster analysis, then, is to describe or map objects in space according to respondents' attitudes, not to predict such a map (Hughes, 1971).

Non-metric multidimensional scaling is similar to factor analysis in that both are data reducing techniques. These techniques have two major advantages. First, in one operation they are able to identify the dimensions and place them in n-dimensional space. Second, they do not require data measured at the interval level (Hughes, 1971). An important assumption of non-metric multidimensional scaling is that an n-dimensional attribute space can be determined from unidimensional data in which the distances represent the degree of similarity/dissimilarity among objects. Non-metric multidimensional scaling shares with factor analysis the disadvantage that the researcher must interpret and label the dimensions after mapping.

Partially Structured Techniques. Partially structured techniques for identifying important dimensions of educational innovations involve systematic procedures for eliciting responses from subjects. The response set, however, is still determined by the respondent. As with other techniques, partially structured procedures can be subdivided by unit of analysis.

Reason analysis, used with individuals, is a set of procedures used to construct causal explanations of decisions, actions or intentions (Lazarsfeld, 1935). In the area of innovation adoption, an individual's judgment regarding the utility of a particular innovation may be subjected to reason analysis. When the purpose of an investigation is to determine how a decision came about (i.e., what steps were taken, what influences were present at the time of the decision, what outcomes the actor expected, etc.) then reason analysis is appropriate. Reason analysis can assist the researcher to uncover the assumptions which an individual decision maker brings to bear in an action situation.

Kelly's Repertory Grid, also used with individuals, is a modification of a testing procedure based on a highly developed and formal theoretical framework called personal construct theory (Kelly, 1955). Personal construct theory posits that man uses his cognitive processes to predict and control his environment. As experience is gained, each individual learns to codify observations into a system of interrelated interpretations, thus developing his own set of personal constructs by which the individual structures his world and learns to anticipate future events. The psychology of personal constructs is concerned with ways to analyze and describe an individual's unique set of constructs as well as to discover how and why these sets develop and change (Bannister, 1962).

The implications of this theory are that an individual responds to a situation in terms of how he uniquely perceives the situation. In turn, an individual's interpretation of a situation is directly dependent upon his current repertoire of personal constructs. Therefore, the ability to understand and predict human behavior depends upon the extent to which the relevant set of personal constructs can be surfaced (Bannister, 1962).

For the purposes of surfacing relevant constructs, Kelly developed the Repertory Grid Testing Technique. A number of forms of the test have developed over the years, each of them tailored to specific purposes. The general method requires respondents to compare innovations along dimensions that the respondent himself generates. Briefly, the technique is applied as follows:

1. A list is drawn up of all the objects in a field under study (e.g., a working universe of types of educational innovations. The length of the list is not critically important, but the optimum number is between 10-30 items or subsets.
2. The items are then transferred onto a set of numbered cards, each of which carries the name of a single object (e.g., a specific innovation).
3. A grid is prepared for recording the subject's responses. The columns of the grid are headed by numbers which correspond to the numbered cards carrying the name of the object or subset.
4. The interviews are carried out individually: a) the subject is shown the entire pack of cards and told to sort through them and remove any with which he is totally unfamiliar; b) three cards are selected in a predetermined random order; and c) the respondent is asked "to think of a way in which any two of the three are similar to each other and different from the third" (Frost and Braine, 1967:165). Thus, without being led, the respondent reveals a construct which he uses to categorize and

differentiate between objects (e.g., innovations) in the field.

5. Having identified a dimension by which the user simultaneously categorizes and differentiates between objects, the respondent is asked to sort through the cards and rate the remaining brands along this dimension. This rating may be in the form of a paired comparison, a ranking, or a rating along a scale.
6. Next the respondent is handed a different set of cards and the procedure is repeated (i.e., "to think of a way in which any two of the three are similar to each other and different from the third"). In addition, the respondent is instructed not to repeat a response that was given previously, in order to generate a new construct.
7. The process continues until the respondent can no longer think of new constructs. The average response is 18 constructs per interview (Frost and Braine,1967). In most cases only 40 interviews are necessary to identify all the relevant attributes in a domain of interest.

The results of the Grid Test may be analyzed in a number of different ways ranging from the very simple to the complex. Basically, the grid which results from this technique has the ordinary properties of a two dimensional matrix. A measure of association between any pair of rows may be computed by counting the number of columns on which they match or the number of rows on which they match. Non-parametric analysis of variance, factor analysis, and multidimensional scaling may be used further to reduce data.

A partially structured technique used with groups for identifying attributes is a modification of the Delphi technique. The Delphi technique was originally developed for the purposes of improving the accuracy of forecasting technological change. The Delphi technique is an iterative procedure used to generate a consensus among individuals in a group with differing judgments about an object or an alternative. During the first round each individual is asked to give an opinion regarding a specific alternative. The results of the group's judgments are then tabulated and fed back to the respondents who are then asked to give another estimate. These iterations of judgments and outcome feedback are continued until the group consensus reaches a fairly narrow range.

A modification of the Delphi technique can be used for determining important attributes of performance measures (Romm and Hulka, 1979). First it is necessary to develop a list of candidate attributes. These candidate attributes can be compiled from a number of different sources (e.g., previous evaluation studies.). Next, a group of experts is asked to review the list of candidate attributes. Each candidate item is then evaluated by the respondents along several dimensions such as, essentiality (i.e., whether an item is likely to be included in a routine assessment of innovations. A summary of the first round responses are then graphically displayed, along with a reminder of the individual's own responses to the original questionnaire and sent back to the respondent. During the second round the respondent is asked to indicate any changes in his assessments, based on the distribution of his colleagues' evaluations. This modified version of the Delphi technique has been used successfully in developing criteria for the assessment of the quality of medical care (Romm and Hulka, 1979).

Another relatively structured technique, but one that may be used with individuals or groups, is the dialectical performance assessment technique (Dunn and Mitroff, 1980; Dunn, Mitroff, and Deutsch, 1981). This technique permits researchers to analyze an individual stakeholder's unique set of attributes (assumptions) and to discover how and why these assumptions change as a consequence of group interaction and debate. While dialectical performance assessment involves explicit and systematic procedures for eliciting judgments and underlying assumptions or attributes, the response set is still determined by subjects who interact in the course of a dialectical debate (see Mason and Mitroff, 1981). The central difference between this technique and other procedures for eliciting interactive group judgment (e.g., Adelman, Stewart, and Hammond, 1975) is that dialectical performance assessment generates attributes from users themselves. While dialectical performance assessment and Kelly's Repertory Grid can both elicit "base-line" measures of uniquely individual attributes, only the former does so as part of group transactions that may be monitored over time. The weakness of dialectical performance assessment is that it provides no systematic procedures for determining whether we have approximated the attribute-space of individuals or groups, whereas Kelly's Repertory Grid permits us to generate a working universe of attributes for individuals and groups. This property of Kelly's Repertory Grid is clearly an advantage with extraordinary implications for improving the validity of applications of multiattribute procedures to problems of adoption of educational innovations, and attempts to investigate the utilization of policy research in general.

All standard multiattribute procedures of which we are aware fail to address satisfactorily what Hoffman (1960) calls the "paramorphic representation" problem. The term paramorphic -- a combined form of "para" (falsely or inadequately) and "morphic" (structure or pattern) -- calls attention to the fact that "the mathematical description of judgment is inevitably incomplete...and it is not known how completely or how accurately the underlying process has been represented" (Hoffman, 1960:125). Slovic and Lichtenstein (1971:675) observe that major regression and Bayesian approaches to multiattribute decision theory — including Brunswik's Lens Model and probabilistic functionalism, social judgment analysis, integration theory, and conjoint analysis -- are alike in their incapacity to deal with the problem of paramorphic representation. Recent innovations in multiattribute procedures (e.g., Saaty, 1980) also share this limitation, as do older and more established techniques such as multidimensional scaling (see Kruskal and Wish, 1978). We believe that dialectical performance assessment and personal construct theory promise major improvements in the theory and applications of multiattribute decision theory, since both are based on a constructivist (rather than objectivist or realist) epistemology that demands the use of research procedures that elicit attributes from stakeholders or subjects themselves.

Explanation of Judgments

All multiattribute procedures seek in some fashion to establish a plausible theoretical basis for explaining variations in judgments. The importance of theory, in this and other cases, is to predict the choice behavior of consumers and users on the basis of statements contained in the theory (e.g., utility functions) that conform to experimentally or statistically established covariations. As Slovic and Lichtenstein (1970:673) observe, multiattribute procedures are based on distinctive theoretical models that posit a variety of compositional rules by which subjects combine or integrate information to make judgments. These compositional rules fall into two broad classes, subjective and objective.

Subjective and objective compositional rules assume diverse forms, some of which are illustrated in Table 3 below. Each of these compositional rules may be subjective (i.e., refer to the subject's judgment processes) or objective (i.e., refer to the subject's external environment). Conjoint analysis, building on (nonparametric) ANOVA designs, attempts to explain variations in judgments by positing additive linear compositional rules whereas functional measurement, building on (parametric) ANOVA designs, is a general heuristic that makes no prior assumptions about the form of compositional rules. Multiattribute utility analysis and social judgment analysis also provide additive linear compositional rules,

Table 3

FORMS OF COMPOSITIONAL RULES WITH ILLUSTRATIVE EQUATIONS

Form	Illustrative Equation
LINEAR⁽¹⁾ ADDITIVE	$U = b_o + \sum_{i=1}^{N} b_i x_i$
LINEAR⁽¹⁾ ADDITIVE-INTERACTIVE	$U = b_o + \sum_{i=1}^{N} b_i x_i + \sum_{\substack{i,j=1 \\ i \neq j}}^{N} b_{ij} x_i x_j$
LINEAR⁽¹⁾ ADDITIVE WITH HIGHER ORDER FUNCTIONS	$U = b_o + \sum_{i=1}^{N} b_i x_i^2$
MULTIPLICATIVE	$U = b_o \prod_{i=1}^{N} x_i^{b_i}$

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(1) The term linear refers to the form of the compositional rule rather than to the form or power of terms contained in the compositional rule.

SOURCE: Johnson and Huber (1977), Table II, p. 316.

although multiattribute utility analysis posits a multiplicative rule as well (Keeney, 1975). Finally, the analytic hierarchy process is an elegant and unique mathematical theory based on a simple additive linear compositional rule (see Saaty, 1980).

The relationship between objective and subjective compositional rules is perhaps most explicitly addressed by social judgment analysis. Building on the psychology of Egon Brunswik, including his Lens Model and its underlying theory of probabilistic functionalism (Brunswik, 1952; 1957), social judgment analysis uses multiple regression analysis to model the judgment process. Each stimulus (alternative) is defined by several characteristics or attributes and measured quantitatively or with dummy variables. Respondents then assess each stimulus by providing an overall numerical evaluation. A regression equation estimates the contribution of each characteristic or attribute (independent variable) to the total variance in the overall numerical evaluation of each stimulus. Once the judgment process has been modeled, according to a linear additive composition rule, the beta weights can be interpreted as the relative importance a subject or judge places on a particular characteristic or attribute.

Social judgment analysis is especially important for our purposes because it seeks, along with Brunswik's probabilistic functionalism, to understand how individuals learn and adapt to their environments. In probabilistic functionalism an individual's judgment depends not only on his cognitive processes but also, and perhaps most decisively, on the tasks he performs (Brehem, 1980:14). The modified Lens Model of social judgment analysis claims that the complexities of "wicked" or "squishy" environments prohibit

> objective specification of the causal relationship between that which is known and that which is to be inferred... Social judgment theory provides a theoretical framework for understanding...disagreement (among policymakers) because it focuses primarily on the cognitive representations of relations between the variables (including their interdependencies) in the environment (Adelman, Stewart, and Hammond, 1975:139-40).

Social judgment analysis seeks to represent an individual's compositional rule by estimating four parameters: (1) the relative importance of attributes (proximal cues), expressed as weights; (2) the form (linear or nonlinear) of the functional relationship between attributes and judgments; (3) the organizing principle (additive or non-additive) used to combine or integrate attributes into an overall judgment; and (4) the consistency (cognitive control) with which attributes are employed to make judgments in a dynamic external environment. Social judgment analysis externalizes properties of an individual's cognitive system, but in doing so avoids contrived and unrepresentative stimuli characteristic of factorial experiments that systematically control levels of treatment conditions.

Generally, social judgment analysis and other multiattribute procedures may employ three classes of tests to validate compositional rules (see Slovic and Lichtenstein, 1971:674): empirical correspondence between observed responses of subjects and those predicted on the basis of subjective compositional rules; empirical correspondence between observed responses and those predicted on the basis of objective compositional rules; and coherence between responses predicted on the basis of subjective and objective compositional rules. Two major problems with these tests are, first, that they may be based on the selection of the less appropriate of two subjective or objective compositional rules, for example, a linear additive rule that does not capture interaction effects. This particular problem, perhaps best described as the isomorphic representation problem, has been addressed by functional measurement, a multiattribute procedure that makes no a priori assumptions about the form of compositional rules. Second, and more serious, is the paramorphic representation problem (Hoffman, 1960; 1968) already discussed in connection with the identification of attributes.

While problems of isomorphic representation can be minimized by various forms of triangulation (Campbell, 1959; Webb et al., 1966), including the three classes of tests described above, problems of paramorphic representation involve substantive (rather than technical or analytic) questions about how to uncover the attributes or assumptions of subjects without imposing on them the language, constructs, and procedures of the researcher. Indeed, only the dialectical performance assessment technique has attempted to develop procedures for identifying user-generated attributes. Thus, in contrast to other multiattribute procedures, dialectical performance assessment is assumption-focused, that is, directed towards the surfacing of attributes that are subjectively meaningful to stakeholders (subjects) themselves. All other procedures, since they have thus far avoided attempts to deal directly with subjective properties, are calibration-focused insofar as the only available tests to validate compositional rules are based on statistical generalizations about the empirical correspondence between predictions and observed behavior and/or the theoretical coherence of two or more compositional rules.

Ultimately, these tests are based on a view of human judgment and decision that is not easily reconciled with recent developments in the logic of practical inference (Dunn, 1981). If all human judgments are contextual — and if these judgments are rooted in cognitive processes that are indexed to specific contexts — then compositional rules are indexical rather than lexical (see Knorr, 1981). The lexical compositional rules of standard multiattribute decision theory — rules that are based on metaphors borrowed from algebra, one of the "ordinary" languages of social scientists — thus provide calibration-focused explanations that are unlikely to overcome the problem of paramorphic representation. Needed are assumption-focused multiattribute procedures.*

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*Although the dialectical performance assessment technique is assumption-focused it does not provide a plausible basis for explaining variations in individual judgments; nor is the hypothesis that conflict is a source of creative group judgment well-established. This theoretical weakness is directly related to limitations (discussed above) in establishing plausible grounds for claiming that a stakeholder's attribute- or assumption-space has been appropriately mapped. Any program of research that seeks to overcome theoretical weaknesses must begin first by "filling" the attribute-spaces of stakeholders.

Unit of Analysis

A third problem characteristic of attempts to apply multiattribute procedures is that of establishing a plausible basis for delineating the scope of involvement in multiattribute decisions. Thus far, most multiattribute procedures have focused on segmented forms of involvement, that is, forms of involvement where a part or segment of some wider population of potentially interested or influential actors participates in making judgments. For example, an individual policymaker, whether real or hypothetical, is the focus of much of multiattribute utility analysis (see Keeney, 1975). Although extensions of MAUT have sometimes focused on groups of stakeholders, the presence of intragroup conflicts and an attendant incapacity to address such disagreements, leads advocates of this particular multiattribute procedure to recommend segmental decisions by single top decision makers or narrowly based groups of experts:

> One function of an executive, boss, or decision maker is to resolve disagreements among subordinates. He can do this in various ways: by substituting his judgment for theirs, by picking one of them as "right" and rejecting the others, or, in the weighted-averaging spirit of multiattribute utility measurement, by assigning a weight to each of the disagreeing subordinates and then calculating weighted-average importance weights (Edwards, Guttentag, and Snapper, 1975:159).

In contrast to segmented forms of involvement that bypass or suppress conflicts among decision makers are comprehensive forms of involvement. Here the idea of "stakeholders" is particulary important, since it calls attention to the fact that complex systems involve multiple decision makers who affect and are affected by policies developed for the system as a whole (see Mitroff, Emshoff, and Kilman, 1979; Dunn, Mitroff, and Deutsch, 1981). Conflicts among multiple stakeholders are not exhausted by formal-analytic limitations on group choice — for example, the formal-analytic impossibility of obtaining transitive group preferences (Arrow, 1963) — but extend to substantial (rather than simply analytic) disagreements about underlying causal assumptions, ethical principles, and goals of practice. By employing the concept of stakeholder as a referent for all system-relevant actors DIAPAT accentuates comprehensive and representative involvement in multiattribute decisions. This orientation towards comprehensiveness enlarges the potential scope of attributes that complicate problems of judgment and justify the use of multiattribute procedures in the first place. To be sure, single decision makers making independent choices bring multiple conflicting attributes to their decisions, if only because their external environments are uncertain and fluid (see Brunswik, 1957; Adelman, Stewart, and Hammond, 1975). But once we begin to add system-relevant actors (stakeholders) these uncertainties and fluidities accelerate exponentially, since stakeholders are judges and objects of judgment at the same time.

No standard multiattribute procedure of which we are aware has attempted to move beyond a focus on segmental involvement. Conjoint analysis and functional measurement are typically employed under contrived and artificial laboratory conditions calling for segmental involvement. While multiattribute utility analysis, social judgement analysis, and the analytic hierarchy process acknowledge the importance of involving multiple decision makers, they do so unsystematically and with little explicit concern for justifying selection processes. MAUT, for example, speaks simply of "stakeholders" but without delineating their scope or characteristics, while social judgment analysis has tended to limit involvement to persons who appear most to influence decisions, thus excluding many who are affected by decisions. Although social judgment analysis seeks to maximize the variability of environments — a procedure quite in keeping with Brunswik's principle of "representative design" — it does not fully extend this principle to maximize the variability among individuals. Although Brunswik's model can be "dialecticized," thus maximizing individual variability (Mitroff, 1974), it may also be argued that probabilistic functionalism, along with other theories of social learning that rest on some form of epistemological realism (Campbell, 1974), are based on analogies to physical systems that are inappropriate for the social sciences because they suppress variations in interpretive structures (Dunn, 1981). Finally, the analytic hierarchy process, while potentially amenable to segmental as well as comprehensive forms of involvement, simply acknowledges that one, several, or many "concerned persons" may be involved (Saaty, 1980:8-9).

The dialectical performance assessment technique is the only existing multiattribute procedure that aims at comprehensive involvement. Antecedents of DIAPAT, while also aiming at comprehensive involvement, have in fact confined choice situations to segmental ones involving corporate and public managers and their staffs (Mason, 1969; Mitroff, Barabba and Kilmann, 1977; Mitroff and Emshoff, 1979). While the involvement of all potentially relevant stakeholders may be agreed on grounds provided by classic theories of democratic participation (see Pateman, 1970), it may also be debated on pragmatic grounds provided by systems theory (see Churchman, 1968; 1979; Ackoff, 1974). If social systems are purposive entities composed of interdependent actors whose interpretive structures are often or always in conflict, one may well find that it is easier to solve many problems at once then to solve single problems sequentially. Since "problems" themselves are a function of conflicting interpretive structures -- rather than "natural" entities standing alone in complex external environments -- comprehensive involvement of stakeholders may reduce the probability of those practical errors and even disasters that seem to be correlated with segmental decision making by "experts" (see Fischhoff, 1977).

Nevertheless, claims about the desirability of comprehensive involvement in multiattribute decision making are hypotheses, merely. No persuasive evidence has been accumulated thus far to show that multiattribute procedures are superior to ordinary bargaining and persuasion in reducing group conflict; nor has a good case been made that deliberate attempts to increase group conflict result in improved decisions (see Schwenk and Cosier, 1980). This issue, as we shall see in the next section, depends not on the scope of involvement, per se, but on the particular measurement process used to elicit individual and group judgments.

The Judgment Process

A fourth problem found in attempts to apply multiattribute procedures is that of establishing a plausible basis for representing the judgment process. In one way or another most advocates of multiattribute procedures claim that the judgment process used in conjunction with their distinctive approach not only yields adequate theoretical explanations of variations in judgments; they also claim or imply that a particular process facilitates improved decisions. Even those multiattribute procedures that aim primarily at the description and validation of psychological laws — that is, functional measurement and conjoint analysis — may also be regarded, at least by implication, as efforts to delineate a repertoire or pool of lawful psychological regularities from which we might select those that are most conducive to improved judgment. Thus, for example, research findings from conjoint analysis (Tversky and Kahneman, 1974) have been used to suggest ways to identify universal biases of evaluation researchers and to argue that greater critical awareness of established statistical principles, when juxtaposed to a variety of uncertainty-reducing yet error-prone heuristic procedures employed in everyday decisions, may reduce errors of judgment (Perloff, Padget, and Brock, 1980:12, 18).

We may thus regard all multiattribute procedures as both descriptive and normative, that is, designed both to represent and improve processes of judgment. Existing differences among multiattribute procedures in this regard are, therefore, largely matters of emphasis. Conjoint analysis and functional measurement are primarily descriptive, dealing as they do with the discovery and validation of psychological laws, but implicitly normative. By contrast, multiattribute utility analysis, social judgment analysis, and the analytic hierarchy process are primarily normative — that is, designed to increase the effectiveness and efficiency of choices — even though each is based on definite underlying theories whose origins lie in statistical decision theory, applied mathematics, or learning theory. Finally, descriptive and normative dimensions may each be subdivided into two additional classes of aims that are confirmatory (i.e., designed to validate established theories) or heuristic (i.e., designed to generate new theories). These four aims of multiattribute procedures are described in Table 4.

(Place Table 4 about here)

For present purposes the normative dimension of multiattribute procedures is most salient, since our aim is to improve as well as describe the judgment process. This does not mean that we are not interested in describing the judgment process — since all normative procedures nessarily involve description — but only that our primary aim is facilitating improvements in the process of selecting innovations for adoption. It should also be noted that rules for successful practice (e.g., recipes) do not necessarily require an understanding of causal links between rule and consequence. Here we join those who seek to devise new and better "decision aids" (Slovic and Lichtenstein, 1971:716-724), including those normative heuristics that are based on man-machine interfaces and computer technology (Edwards, 1962; Howell, 1967; Schum, 1969; Dawes, 1971; Adelman, Stewart, and Hammond, 1975; Mason and Mitroff, 1981).

Normative oriented multiattribute procedures are based on different claims about the improvements we may expect if certain judgment processes are used to make

Table 4

FOUR AIMS OF MULTIATTRIBUTE PROCEDURES

		Primary Methodological Aim	
		Descriptive	Normative
Primary Theoretic Aim	Confirmatory	CONJOINT ANALYSIS(1)	MULTIATTRIBUTE UTILITY ANALYSIS(2)
	Heuristic	FUNCTIONAL MEASUREMENT(3)	SOCIAL JUDGMENT ANALYSIS(4) ANALYTIC HIERARCHY PROCESS(4) DIAPAT(4)

NOTES: (1)Descriptive confirmation focuses on psychological laws of everyday information processing, for example, the "law of small numbers" (Tversky and Kahneman, 1971).

(2)Normative confirmation focuses on Bayes' theorem (Edwards and Phillips, 1964) and axioms of choice (Keeney, 1975).

(3)Efforts made to discover psychological laws governing the use of composition rules to make judgments (Anderson, 1964; Meyer, Levin, and Louvieve, 1981).

(4)Efforts made to discover lawful regulations in judgment that reduce probabilities or absolute levels of error, either statistical or conceptual (see Hammond, 1965; Saaty, 1980; Dunn and Mitroff, 1980).

decisions. Multiattribute utility analysis, for example, claims that stakeholders who follow a compositional judgment process will make better decisions. Here the judgment process begins with multiattribute decisions that are subsequently composed (aggregated) in the form of a weighted average (Edwards, Guttentag, and Snapper, 1975:156):

$$U_i = \sum_{1} w_j u_{ij}$$

where U_i is the aggregate utility for the i-th alternative, w_j is the normalized importance weight of the j-th attribute, and u_{ij} is the scale value of the i-th alternative on the j-th attribute. The decision rule (U_i max) is compositioned insofar as it depends on prior judgments about the value or utility of alternatives. A similar compositional process underlies the analytic hierarchy process (Saaty, 1980).

By contrast, other multiattribute procedures claim that stakeholders (judges) who follow a decompositional judgment process will make better decisions. Here the judgment process begins with multiattribute decisions that are subsequently decomposed into importance weights, for example, by using regression (beta) weights as indicants of importance (Adelman, Stewart, and Hammond, 1975:14):

$$Y_s = B_1G_1 + B_2G_2 + \ldots + B_mG_m + e$$

where Y_s is the stakeholder's (policymaker's) judgment, G_j are attributes (cues, factors) upon which the judgment is based, B_j are beta weights that indicate the relative importance of each attribute (cue, factor) for the stakeholder's judgment, and e is a random error term. As an antecedent of DIAPAT strategic assumptional analysis (Mitroff and Emshoff, 1979) is also based partly on decompositional judgment processes.

Compositional and decompositional variants of multiattribute decision theory make normative claims about the beneficial effects that follow when their respective judgment processes are used by decision makers. Generally, compositional judgment processes are believed to reduce bias, while decompositional processes are believed to reduce the unreliability (inconsistency) of judgments (Slovic and Lichtenstein, 1971:721-722). Thus, Edwards, Guttentag, and Snapper (1975:158-159), in claiming that MAUT reduces interpersonal disagreements, offer the following explanation:

> When making wholistic evaluations, those with strong points of view tend to concentrate on those aspects of the entities (alternatives) being evaluated that most strongly engage their biases. But the multiattribute procedure does not permit this; it separates judgment of the importance of a dimension from judgment of where a particular entity falls on that dimension... Agreement (on some non-controversial dimensions) tends to water down disagreement on controversial dimensions in a multiattribute utility procedure.

By contrast, social judgment analysis claims that stakeholders who employ its characteristic judgment processes will experience reduced levels of conflict, distrust, and hostility, but for different reasons. Social judgment analysis asserts that "policy quarrels can be described in terms of the cognitive parameters (weights, function forms, organizational principles, and consistency) of the participants (Adelman, Stewart, and Hammond, 1975:140).

The distinction between compositional and decompositional judgment processes is related to another important difference among multiattribute procedures. Some multiattribute procedures are compensatory; meaning that changes in the value of one attribute can be offset ~~by~~ or traded for commensurate changes in some other attribute. Other multiattribute procedures are noncompensatory, since changes in the values of one attribute cannot be offset or traded against an increase (or decrease) in the values of other attributes (see Green and Wind, 1973:38-46). Johnson and Huber (1977:316) make this same distinction in terms of "scoring" and "screening" models.

All multiattribute procedures except DIAPAT are compensatory insofar as they represent judgment processes in terms of wholistic assessments of the value or utility of alternatives. While compensatory procedures are based on different compositional rules (see Table 3), each assumes that attributes may be traded off in some fashion. Noncompensatory procedures, by contrast, assume three principal forms: dominance, conjunction-disjunction, and lexicographic ordering (Green and Wind, 1973:40-42). Strictly speaking, compositional procedures cannot also be noncompensatory since they posit judgment processes that involve holistic assessments of different kinds. Yet it is clear that judgment processes may also be represented as "phases" where different processes of judgment are brought to bear in making choices over time. Thus, for example, DIAPAT begins with a decompositional-compensatory process where stakeholders make overall judgments about alternatives that are subsequently decomposed into assumptions (attributes of alternatives that are scaled by their importance and certainty as elements of an overall argument (see Dunn, Mitroff, and Deutsch, 1981). Once these attributes have been plotted on a grid, subsequent judgments are noncompensatory insofar as a disjunctive decision rule serves to accept assumptions that fall into the quadrant that involves the most important and least certain assumptions. This procedure sets the stage for a dialectical debate (Mitroff and Emshoff, 1979). The general form of the disjunctive judgment process may be represented as:

> Given nonempty subsets of X, $X_1^*, X_2^*, \ldots, X_m^*$,
> $X = (X_1, X_2, \ldots, X_j, \ldots, X_m)$ is valued only if
> $X_j \in X_j^*$ for some j $(j = 1, 2, \ldots, m)$.

In Table 5 properties of DIAPAT and other multiattribute procedures are compared and contrasted.

(Place Table 5 about here)

A final distinguishing characteristic of multiattribute procedures — and one which again differentiates DIAPAT from other procedures — is the mode of involvement in multiattribute decisions. Generally, involvement may take one of three forms: active, interactive, and transactive. Active involvement of judges is a characteristic of conjoint analysis and functional measurement, where individual

Table 5

PROPERTIES OF MULTIATTRIBUTE JUDGMENT PROCESSES

	Compositional	Decompositional
Compensatory	MULTIATTRIBUTE UTILITY ANALYSIS ANALYTIC HIERARCHY PROCESS	SOCIAL JUDGMENT ANALYSIS CONJOINT FUNCTIONAL MEASUREMENT
Noncompensatory	MULTIATTRIBUTE UTILITY ANALYSIS(1)	DIALECTICAL PERFORMANCE ASSESSMENT(2)

NOTES: (1)When results of MAUT are "screened" by top decision makers or experts we assume that it is a phase model requiring the use of some noncompensatory (dominance, conjunctive-disjunctive, lexicographic) decision rule.

(2)DIAPAT is explicitly designed in several phases, the second of which involves the use of a disjunctive and noncompensatory decision rule.

stakeholders (judges, consumers) take an active role in making choices but do not directly share their judgments with other stakeholders. Interactive involvement is a characteristic of multiattribute utility analysis, social judgment analysis, and the analytic hierarchy process. Each of these three procedures involves different forms for "externalizing" — that is, making public or objectifying — judgments. The most general of these externalizing processes is that of multiattribute utility analysis, where "discussion, persuasion, and information exchange should be used in an attempt to reduce the disagreements as much as possible" (Edwards, Guttentag, and Snapper, 1975:159). Slightly more focused are procedures recommended by Saaty (1980:9), where each member of a group with conflicting interests may be instructed to

> develop the outcome using his judgments and assuming judgments for the other parties, note the outcome, and compare it (perhaps with the aid of a computer) with what the others arrive at. The process reveals what outcome each party is exerting pressure to achieve. The crucial upshot of this is to induce cooperation.

The most specific and operational procedures for structuring interactive involvement developed thus far and those of social judgment analysis. Here the use of computer graphics technology provides "(1) immediate statistical analysis of the judgment process, in terms of weights, function forms, and consistency (this statistical analysis is called 'policy-capturing'), and (2) immediate pictorial description of these parameters (this is called 'externalization'). In short, they permit an accurate description of the cognitive process that is the basis for disagreement" (Adelman, Stewart, and Hammond, 1975:141).

Transactive involvement of judges is characteristic of DIAPAT, but not of other multiattribute procedures. While transactive involvement is also interactive, since stakeholders do externalize and share publicly their judgments, DIAPAT also involves an explicit process for transacting the meaning of such judgments. The term "transaction" refers to processes of examining the assumptions (attributes) brought to bear in affirming and contesting the plausibility of judgments, all of which are viewed as putative knowledge claims. Dunn (1981) has described a transactional model of knowledge (information) utilization based on a structural model of argument developed by Toulmin (see Toulmin, 1959; Toulmin, Rieke, and Janik, 1979) and extended to policy analysis and planning by Mason and Mitroff (1981).

One of the central aims of this transactional model is to evoke the taken-for-granted assumptions that are tacitly employed to assess statistical and causal inferences that are externalized by social judgment analysis in the form of computer graphics (e.g., the "cognograph"). Transactional involvement, while it involves conflict, bargaining, and negotiation, is not confined simply to the consideration of maximally different alternatives (compare Schwenk and Cosier, 1980), but extends to the reflective examination of the underlying cognitive grounds of disagreements among stakeholders. Dunn (1981) claims that the transactional model is particularly well-suited to research into competing standards of assessment used in real-world settings to assess theoretical and practical claims alike, since it "provides a visual schema for mapping arguments, compels a reflective and critical posture towards (hidden) presuppositions of knowledge claims, yields a classification of truth, relevance, and cogency tests, and permits a provisional listing of threats to usable knowledge."

In surveying alternative multiattribute procedures this review has moved sequentially through four important issues that involve the identification of attributes, the explanation of judgments, the choice of units of analysis, and the representation of the judgment process. We have deliberately avoided technical issues, not only because such questions are adequately treated in available literature but because we wished to identify salient methodological properties of procedures. As this review makes clear, standard procedures for classifying multiattribute procedures are often based on surface technical distinctions that obscure rather than clarify their strengths, limitations, and potential applications. Moreover, it seems clear that the kinds of procedures that may alleviate the problems we have raised are likely to require a significant departure from past traditions or, to use a now hackneyed phrase, a movement towards "new paradigms" of multiattribute decision theory. What we have called the dialectical performance assessment technique represents in many respects an attempt to shape a new paradigm. This is evident when we compare and contrast, in summary form, DIAPAT and other multiattribute procedures (Table 5).

CONCLUSIONS

This working paper began by arguing that judgments regarding the utility of educational innovations is best viewed as a multiattribute problem. In the context of school improvement, a multiattribute problem is one in which evaluation of an educational innovation depends on the subjective standards of assessment (attributes, assumptions) employed by stakeholders who attribute different properties to education and systems to measure educational outcomes. We then compared and contrasted multiattribute procedures according to four key methodological dimensions, including the grounds for identifying attributes, the forms in which they are externalized and explained, the scope of representation in decisions, and the mode of involvement in such decisions.

We found that the majority of multiattribute procedures differ substantially from DIAPAT, although there is at present no convincing evidence that DIAPAT or its antecedents (strategic assumptional analysis) are superior

Table 5

COMPARISON OF MULTIATTRIBUTE PROCEDURES

	Property			
Procedure	Ground of Attributes	Focus of Explanation	Scope of Involvement	Mode of Judgment
MULTIATTRIBUTE UTILITY ANALYSIS	Researcher-Imposed	Calibration-Focused	Segmental	Active or Interactive
CONJOINT ANALYSIS	Researcher-Imposed	Calibration-Focused	Segmental	Active
FUNCTIONAL MEASUREMENT	Researcher-Imposed	Calibration-Focused	Segmental	Active
SOCIAL JUDGMENT ANALYSIS	Researcher-Imposed	Calibration-Focused	Segmental	Active or Interactive
ANALYTIC HIERARCHY PROCESS	Researcher-Imposed	Calibration-Focused	Segmental	Active or Interactive
DIALECTICAL PERFORMANCE ASSESSMENT	User-Generated	Assumption-Focused	Comprehensive	Transactive

to other multiattribute procedures in improving complex decisions. Finally, we observed that methodological properties of the majority of multiattribute procedures are inconsistent with requirements for alleviating ill-structured problems, generally and in the specific context of measuring judgments of the utility of an innovation. Yet this claim is based on essentially intuitive and logical grounds, a weakness that may be remedied through directed research.

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VII

USABLE KNOWLEDGE: A METATHEORY OF POLICY RESEARCH IN THE SOCIAL SCIENCES

William N. Dunn

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ABSTRACT

In an attempt to untangle the field of knowledge use, this paper develops an extended typology designed to capture the most basic properties of present-day theories of knowledge use. Rather than siding with any particular theory, or an ideal-type of which it is an illustration, each theory is taken as a "datum". At a metatheoretical level, propositions and attendant corollaries are generated fro making statements about ideal-typical theories as a whole.

USABLE KNOWLEDGE: A METATHEORY OF POLICY RESEARCH IN THE SOCIAL SCIENCES*

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This paper outlines a metatheory of policy research in the social sciences, that is, an organized set of propositions about existing theories of usable knowledge. By outlining the main contours of a metatheory of policy research I seek, first, to counter the regrettable present trend towards conceptual entanglement that now characterizes much theoretical work on the uses of social research in public policymaking. Second, by engaging in a process of reflective theory-building I hope to uncover and raise to a level of explicit consciousness many unexamined assumptions and hidden standards of assessment that now impair or corrupt our understanding of the role of policy research in social problem solving. Finally, I want to supply a metatheoretical structure that promotes at least marginal improvements in our capacity to understand and planfully shape the production of usable knowledge.

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My major substantive claim is that the understanding and conduct of policy research may be improved by adopting propositions and principles of "critical constructivism," a metatheory of knowledge use with eclectic multidisciplinary origins. In making this claim I should state at the outset that I am not interested in siding with any particular theory; nor do I propose to provide a quick "paradigmatic fix" that will suddenly heal some ailing worldview. My aim, rather, is to create a metatheoretical structure that permits and even compels a more reflective posture towards the role and limitations of policy research in the social sciences.

Arguments offered in support of my claim are organized in four sections. In the first section I compare and contrast alternative definitions of knowledge use, arguing that a division of phenomena-to-be-explained (explananda) into "subjective" versus "objective" properties represents a suitable starting point for sorting existing theoretical perspectives. The structure of the second section is similar to the first, except that here I compare and contrast alternative explanations of knowledge use, arguing that a division of explanations (explanantes) into "imposed" versus "generated" phenomena provides an appropriate additional basis for distinguishing theoretical perspectives. The third section creates, on the basis of the inter-section of explananda and explanantes of knowledge use presented in the first two sections, a four-fold typology of theoretical perspectives. These perspectives are then further differentiated according to characteristics of three media (knowledge, users, and social systems) through which imposed versus generated explanations of knowledge use operate. The product is an expanded typology that captures many of the most important theoretical claims and assumptions about the role of policy research in producing usable knowledge. Finally, the fourth section outlines propositions and corollaries of "critical constructivism." The argument is that this particular metatheoretical posture not only helps uncover and explore complementary features of existing perspectives; it also provides norms for developing new and more appropriate theories of policy research that enlarge the domain of usable knowledge--that is, knowledge that enhances our collective learning capacities.

KNOWLEDGE USE: THE CRITERION PROBLEM

One of the most basic questions about any field of inquiry surrounds the criteria used to define its subject matter. At present it is difficult to bound the field of knowledge use in meaningful and persuasive ways, chiefly because the field is highly fragmented and conceptually "soggy" (Weiss, 1977:11). As Ganz (1981:186) observes, there has been a "continued adherence to an 'iron triangle' between creation, diffusion, and utilization without reference to the complex interactions among these activities, institutional arrangements, and social change..." Researchers have tended "to think of themselves as working--or at least concentrating--on knowledge creation, knowledge diffusion, or knowledge utilization. As a result, these three subfields in the study of knowledge have evolved relatively independently of each other" (Rich, 1981a:7). Thus far, there is no plausible theoretical foundation that links these three subfields, while the "tangled literature" (Nelson and Winter, 1977) of the field as a whole reflects the absence of a minimal set of criteria for defining knowledge use as a dependent variable or phenomenon-to-be-explained (Zaltman, 1980; Dunn and Holzner, 1981).

Under such conditions several alternatives are available to those who wish to impart more structure and coherence to the field. Along with Lindblom and Cohen (1979), Wildavsky (1979), and Knott and Wildavsky (1980) we can elevate our present difficulties to the status of an ontological principle, announcing that the "nature" of the policy-making process or of knowledge itself imposes essentially unalterable constraints on the creation of usable knowledge. Here we run the risk of attributing properties of "irrationality" to social systems when, in fact, (ir)-rationality is a property of the constructs we ourselves offer to explain them. Alternatively, we may acknowledge the complexity of knowledge use in contexts of practice, arguing that contextually determined definitions of knowledge and of use are unique indexical expressions (Knorr, 1981). Here we risk the abandonment of knowledge use as a "pseudo-problem" when, instead, it is an authentic problem whose generalizable dimensions we are simply unable to penetrate with the tools at hand. A third alternative is to develop a loosely organized multidisciplinary strategy, appropriating whatever insights may be available in existing social science disciplines (sociology, political science, economics, psychology, anthropology) and their many subfields (sociology of knowledge, economics of information, cognitive psychology, applied anthropology) and hybrids (planned social change, communication of innovations, information sciences, artificial intelligence). Here the major risk is an unreflective brand of eclecticism and a diffuse labelling process that may further entangle or even knot orientations in the field.

Another alternative is to begin with the field as it is, taking theoretical diversity and conflict as a datum or problematic situation which we might organize in more plausible and productive ways. Here we aim not at "solving" the problem--for example, by employing a favored discipline-based model or hybrid which yields explanations that shun the very complexity we wish to make intelligible--but at "structuring" the problem as a necessary prelude to eventual solutions. To do so, however, requires that we systematically uncover competing theoretical perspectives of knowledge use and their underlying assumptions.[1] In this way we may discover complementarities as well as conflicts among different perspectives, avoiding any mistaken impression that a single theory adequately represents the role of policy research in producing usable knowledge.

The discussion that follows attempts to classify or sort theories of knowledge use according to answers provided to two questions:[2] (1) How is knowledge use defined? (2) How is knowledge use explained? The first question leads us towards alternative assumptions about knowledge use as a phenomenon-to-be-explained (explanandum), while the second yields assumptions about classes of phenomena which explain knowledge use (explanantes). By pursuing both questions at once we may avoid the kinds of difficulties that arise when two or more perspectives based on a common definition of knowledge use--and, thus, may be viewed as theoretical cohorts--also propose fundamentally different explanations. The same situation arises in reverse when two or more perspectives are based on a similar explanation of entirely different phenomena. Accordingly, the plethora of conflicting research findings and conclusions that characterizes the field is not due so much to an absence of definitions of "utilization," or even of multiple outcome measures (Larsen, 1981:151), but to the presence of conflicting and/or mixed definitions and explanations of knowledge use, however implicit or ambiguous these might be.

Existing definitions of knowledge use seem to share at least one property in common: Knowledge use is a cognitive relation among two or more purposively behaving actors. By specifying that knowledge use is a "cognitive" relation we mean that the accompaniment of one actor's behavior by that of another is somehow affected by the act or faculty of knowing. Indeed, it is this cognitive stipulation, and perhaps this alone, that differentiates knowledge use from disciplines or fields that investigate other types of relations based, for example, on power, status, or exchange.[3]

By stipulating that the behavior in question is purposive we call attention to the teleological character of knowledge use. The striking common feature of otherwise conflicting definitions of knowledge use is their dependence on assumptions about the motives, intentions, or purposes of "producers" and "users." In one of the broadest classifications available Machlup (1962, 1980), for example, extends Scheler's three-fold classification of knowledge (intellectual, instrumental, spiritual) by providing a teleological contrast among intellectual, practical, spiritual, pastime, and unwanted knowledge. Classifications of use--for example, "conceptual," "instrumental," and "symbolic" uses of knowledge (Rich, 1975; Caplan, 1979; Knorr, 1977)--follow a similar pattern of teleological reasoning. Indeed, it is difficult to formulate a satisfactory definition of knowledge or of use that does not hinge on the purposes of "knowers" or "users" (see Churchman, 1971).

Agreement on this abstract definition of knowledge use begins to dissipate when we consider specific features of existing perspectives. While knowledge use may be a cognitive relation among purposively behaving actors, this cognitive relation may be defined in two fundamentally different ways: one type of definition emphasizes _objective_, observable, and overt cognitive relations among purposively behaving actors, while the other stresses _subjective_, non-observable, and covert cognitive relations.[4] The difference between these definitions, as Wallace (1969:6-7) observes of social relations in general,

> corresponds to the difference between the Newtonian and Weberian definitions of "action." Newton's definition of mechanical action was entirely in terms of external observables... Weber took exactly the opposite view by asserting that bodies' social action

> is so far distinguishable from mechanical action as to be definable only in terms of their internal states.

Although there may be and often is considerable overlap between these two types of definitions in particular theories of knowledge use, it remains possible to characterize theories in terms of their emphasis on one type of cognitive relation rather than the other. Thus, for example, while Machlup includes in his definition of knowledge use both the "process of informing" (an objective cognitive relation) and the "message or knowledge conveyed" by this process (a subjective cognitive relation), he nevertheless defines the use of knowledge as a subjective cognitive relation:[5]

> If one wants to be consistent in keeping separate the process of informing and the message or knowledge conveyed by that process, one would be well advised to avoid altogether speaking of "uses" of information, except if one wishes to refer to choices among alternative modes of information... use of a mode of information should not be confused with the use of the message or knowledge conveyed (Machlup, 1979:65).

The definition of knowledge use as a subjective cognitive relation is evident in many other perspectives. House (1981:12-13), for example, recommends that investigations of knowledge use in education be "directed at the different 'meanings' produced by the change efforts rather than at the change itself," citing an example where an unsuccessful attempt to introduce PPBS was accompanied by extensive culture conflict (see Wolcott, 1979). Similarly, Aaron (1978:159) stresses that the use of research and experimentation on poverty, while it is seemingly unconnected to specific overt changes in the behavior of policymakers, nevertheless "corrodes the kind of simple faiths on which political movements are built." In the same vein, Patton's work on utilization-focused evaluation defines knowledge use in terms of "more penetrating perspectives, increased capabilities, and greater commitments to action" (Patton, 1978:290). Caplan, while acknowledging the importance of objective cognitive relations associated with "instrumental" use, stresses the importance of subjective relations found to characterize "conceptual" use among high-level policymakers confronted by macro-level problems of high complexity (Caplan, 1979:465).

In contrast to an emphasis on subjective cognitive relations we find those who stress objective, observable, and overt cognitive relations. Here there is no apparent reference to underlying purposes, motivations, or intentions. Thus, for example, knowledge use has been viewed as an overt process of adopting and implementing research-based innovations (National Institute of Education, 1978), or as a change in the structure and functioning of a social system (Rogers, 1973). These definitions of knowledge use, which emphasize directly observable consequences of acting on knowledge--that is, an objective cognitive relation--assume that use occurs when an entire set of recommendations is implemented in a form suggested by researchers (Larsen, 1981:150).

Perhaps the clearest example of a definition of knowledge use in terms of objective cognitive relations is provided in a study of the use of evaluation research in criminal justice (Larson and Berliner, 1979). Noting that "evaluation is a process that produces information to assist in the allocation of resources," the authors go on to define use in terms of the "decision-consequential impact" of research on decisions involving "an irrevocable allocation of resources" (Larson and Berliner, 1979:2). Quoting Howard (1966), the authors contend that "a decision is not a 'decision to make a decision,' but rather the concrete action implied by the decision" (Larson and Berliner, 1979:23n).[6]

The distinction between subjective and objective cognitive relations, while it provides a suitable basis for comparing and contrasting the explananda of theories of knowledge use, fails to acknowledge several additional distinctions. For example, alternative distinctions involving macro and micro levels of use have been employed by Caplan (1979), while more differentiated classifications of types of use are available in the literature (e.g., Larsen _et_ _al_., 1976; Weiss, 1976; Hall and Loucks, 1977; Dunn, 1980; Knott and Wildavsky, 1980; Zaltman, 1980; Rich and Goldsmith, 1981). The most appropriate position towards these alternative distinctions is simply to argue that the subjective-objective distinction captures many of the most important definitions current in the field. Indeed, the subjective-objective distinction uncovers and clarifies behavior now treated in these classifications as if it shares some single underlying property. For example, Knott and Wildavsky (1980:546) propose a seven-fold typology of "standards of knowledge utilization," some of which (e.g., cognition and reference) conform to what we have defined as a subjective cognitive relation, while others (e.g., implementation and impact) are instances of objective cognitive relations.

Finally, the use of the subjective-objective distinction to differentiate explananda of theoretical perspectives omits distinctions based on ordinary and scientific knowledge (Lindblom and Cohen, 1979), frames of reference (Holzner and Marx, 1979), truth tests and utility tests (Weiss and Bucuvalas, 1980), and policy sectors, arenas, and institutional contexts (Rich, 1979; J. Weiss, 1979). This omission is deliberate, since it is these and similar distinctions that permit us to differentiate the explanantes of theories of knowledge use.

KNOWLEDGE USE: THE PROBLEM OF EXPLANATION

Apart from their different emphases on subjective and objective cognitive relations, available theories also offer different classes of phenomena to explain knowledge use. Theories which adopt a common definition of knowledge use as a subjective cognitive relation (e.g., "conceptual" use) frequently advance different explanations of this same phenomenon--for example, explanations derived from knowledge-specific, policymaker constraint, or two-communities theories of knowledge use (see Caplan, Morrison, and Stambaugh, 1975). A similar situation sometimes exists in reverse, since authors who share the same explanatory schema--for example, an interactive, pluralistic, and incremental theory of policy-making--may hold fundamentally different definitions of knowledge use. Thus, while Lindblom and Cohen (1979:12) affirm that "knowledge is knowledge to anyone who takes it as a basis for action," Wildavsky (1979:27-28) and Knott and Wildavsky (1980) reserve the term "knowledge" for

> ...theories relating policy variables to effects where the principles are confirmed by the empirical test of repeated decisions... When policy makers are certain that manipulating these variables will produce the expected effects--that is, if "x" is done, "y" will follow with a known probability--then they have knowledge (547, 546. Emphasis supplied.).

Whatever else one may say about interactionist explanations of knowledge use, in this case their authors hardly share a common or cohesive theory--they are attempting to explain entirely different phenomena.

The principal phenomena offered to explain knowledge use may be grouped into two main classes: conditions that are imposed on users by the given nature of knowledge, of users themselves, or of the social systems in which they interact; and conditions that are generated by users as they create knowledge, their own standards for assessing knowledge, or the social systems of which they are members. The first type of explanation implies that knowledge use is "natural," "determined," or "imperative," while the second suggests that knowledge use is "artificial," "self-determining," or "constructed."[7]

Theories of knowledge use which provide explanations stressing imposed phenomena are sometimes offered by those concerned with the nature of social science knowledge and its affects on research utilization. For example, Bernstein and Freeman (1975), observing that "there have been few cases of actual effective utilization of evaluation research for expected purposes" (5), offer an imposed explanation based on assumed characteristics of "quality" research and the attendant failure of federal agencies to ensure production. "Quality" research is defined as research that conforms to standards of experimental and quasi-experimental design (100-101), while the failure to enforce such standards is described in the following terms:

> ...there is neither a federal evaluation policy nor a set of requirements and guidelines regarding what constitutes an appropriate evaluation. This lack has severe consequences. It results in a failure to enforce any standardized set of evaluation requirements, even when present in legislation (Bernstein and Freeman, 1975:6).

Whereas this and related perspectives (e.g., Yin et al., 1976) seek to explain decision processes and other objective cognitive relations primarily in terms of imposed knowledge-specific characteristics, others stress imposed explanations based on assumptions about the nature of users or their environing social systems. For example, Mitroff and Mitroff (1979) employ Jungian personality theory, which assumes given underlying personality structures or traits, to explain patterns of interpersonal communication among knowledge users and producers. Whereas this imposed explanation focuses on user-specific characteristics, others stress phenomena that operate through social systems. For example, the weight of arguments offered in support of theories of a "post-industrial" society (Bell, 1973) is borne by explanations that stress conditions which are imposed by social system-specific characteristics--particularly, the proposition that the growing interdependencies, complexity, and pace of change of contemporary society make existing knowledge obsolete, thus increasing the demand for new forms of policy-relevant knowledge (see Straussman, 1978).

Theories of knowledge use are also based on explanations that emphasize phenomena which are generated by users as they create knowledge, their own standards for assessing knowledge, or the social systems of which they are members. For example, Carol Weiss outlines three classes of generated conditions which parallel distinctions among knowledge-specific, user-specific, and social system-specific characteristics: knowledge-driven, decision-driven, and interactive models of knowledge use (C. Weiss, 1977: 11-14). In her own work Weiss has offered explanations based primarily on phenomena generated by users--specifically, the truth tests and utility tests that constitute the frames of reference of decision makers (Weiss and Bucuvalas, 1980). Whereas Lindblom and Cohen (1979) are concerned with knowledge-specific characteristics in general--that is, with relations between "ordinary" and "scientific" knowledge--Weiss and Bucuvalas specifically address knowledge as a product of user-specific frames of reference. That they are not principally interested in social system-specific characteristics is evident in their description of their enterprise as a classical sociology of knowledge "turned upside down" (see Holzner, 1978:8):

> Whereas the classical sociology of knowledge was concerned with the social bases of intellectual productions, a sociology of knowledge application would be concerned with the social bases of intellectual productions, a sociology of knowledge application would be concerned with the social consequences of knowledge...[there is a] need for understanding the multiple frames of reference with which actors perceive knowledge and the discrepancies between the frames of reference of knowledge producers and knowledge users (Weiss and Bucuvalas, 1980:302).

Finally, other explanations place primary emphasis on phenomena generated by social systems. Janet Weiss argues that attention to "relationships between the structures of policy making and the avenues by which social science may participate in policy debates permits analysis of both the overall level of social science use that sectoral arrangements seem to support and the particular kinds of use that sectoral arrangements encourage" (J. Weiss, 1979:439). Caplan provides a similar but more general explanation by stressing generated phenomena that also operate through social systems. In Caplan's words, "social scientists would be well advised to pay particularly close attention to the utilization theories that stress the lack of interaction between social scientists and policymakers as a major reason for nonuse" (Caplan, 1979:461; see also Caplan, Morrison, and Stambaugh, 1975 and Poppen, 1978).

A TYPOLOGY OF THEORETICAL PERSPECTIVES

The intersection of definitional and explanatory dimensions outlined in the preceding sections yields a basic typology for classifying theories of knowledge use (Figure 1). The product of the typology is four ideal types that capture basic properties of contemporary theories. In Figure 1 these ideal types have been labelled with terms that describe the essential features of competing definitions (explananda) and explanations (explanantes), as these have been discussed so far, rather than the disciplinary orientations (e.g., "philosophy of science" or "sociology of knowledge") or preferred metaphors (e.g., "two-communities theory") of their authors. By treating these four theoretical perspectives as ideal types, and by attaching labels that describe their most basic theoretical properties, we may circumvent some of the conceptual entanglements that now characterize the field.

One major ideal-typical theory of knowledge use may be designated "interactional imperativism," since it defines knowledge use in primarily objective (interactional) terms and offers explanations that stress phenomena that are imposed on users (imperative). The work of Knott and Wildavsky (1980) closely approximates "interactional imperativism," as we have characterized this perspective, since their theory of dissemination and knowledge use holds that the overt and observable utilization behavior of policymakers is a function of the availability of "authentic" knowledge provided through "natural" processes. Specifically,

> ...premature dissemination in the absence of knowledge contributes to information overload, thus making dissemination a cause of underutilization rather than a cure. Dissemination should not substitute for supply when natural processes are cheaper and more effective ... Three difficulties stand out: pretensions to knowledge, which make many dissemination efforts premature; artificiality (or the Newcastle syndrome) substitutes unnecessarily for the natural spread of knowledge; and the Mathew effect in which those policy makers who are the most in need of dissemination are also the ones who are the least able to process and apply what is sent (Knott and Wildavsky, 1980:573, 574).

A second ideal-typical perspective, "cultural imperativism," defines knowledge use in essentially subjective (cultural) terms and provides explanations that stress phenomena that are imposed on users (imperative). An impressive recent treatise on knowledge and knowledge production (Machlup, 1980) approximates

Figure 1

A BASIC TYPOLOGY FOR CLASSIFYING THEORIES OF KNOWLEDGE USE

The Principal Phenomena that Explain Cognitive Relations are:	The Principal Cognitive Relations that Define Knowledge Use Are:	
	OBJECTIVE (Interactional)	SUBJECTIVE (Cultural)
IMPOSED ON USERS (Imperative)	INTERACTIONAL IMPERATIVISM	CULTURAL IMPERATIVISM
GENERATED BY USERS (Constructed)	INTERACTIONAL CONSTRUCTIVISM	CULTURAL CONSTRUCTIVISM

cultural imperativism, as we have defined it, since the emphasis is on a "knowledge industry" constituted by given structures of production and occupational specialization which create new and diverse forms of knowledge. While "for most parts of the production of knowledge no possible measure of output can be conceived that would be logically separate from a measure of input" (Machlup, 1980:225), the class of imposed phenomena used to explain knowledge and its use are based on

> an industry approach to the total value of the output of all firms, agencies, departments, etc., that generate or disseminate knowledge, and an occupation approach to the amount or value of the input of knowledge producing labor (Machlup, 1980:227).

A third ideal-typical perspective, "interactional constructivism," defines knowledge use in primarily objective (interactional) terms and supplies explanations that stress phenomena that are generated by users (constructed). Interactional constructivism is evident in explanations that stress "the symbiotic relationships among policy actors, knowledge, and the political and institutional context of policy making" (J. Weiss, 1979:456-57). The use of knowledge by policymakers

> cannot be understood independently of the processes for making public policy. These processes provide the critical organizational and political contexts that shape policy makers' needs for outside expertise; create organizational channels of information flow that routinely bring (or fail to bring) ideas and evidence to policy makers' attention and define problems, decision situations, policy alternatives, and solutions in ways that determine which evidence is considered to be relevant (J. Weiss, 1979:439).

The fourth and final perspective in our basic typology is "cultural constructivism," an ideal-typical theory best represented by the work of Knorr (1981). Cultural constructivism defines knowledge use in essentially subjective (cultural) terms and offers explanations that stress phenomena that are generated by users (constructed). For Knorr, contexts of practical action are radically under-determined by generalizable standards or rules. As such, practical action is indexical:

> ...rules and decision criteria, and more generally definitions of the situation, are interpreted in context...it is the concrete, local translation of rules or decision criteria which determine the selections that are made, and which subsequently shape the outcomes of these selections (Knorr, 1981).

Clearly, these four ideal-typical theories are highly general and abstract; they do not capture particular assumptions, propositions, or hypotheses put forth in alternative theories of knowledge use. For this reason it is desirable to differentiate the basic typology into additional subclasses of explanations (Figure 2). This yields an expanded typology based on additional distinctions among knowledge-specific, user-specific, and social system-specific properties of imposed and generated explanations. The product of this expanded typology is twelve ideal-typical perspectives of knowledge use. These twelve perspectives are illustrated below with statements drawn from the work of leading contributors to theory and research on knowledge use.

Figure 2

AN EXPANDED TYPOLOGY FOR CLASSIFYING THEORIES OF KNOWLEDGE USE

The Principal Phenomena that Explain Cognitive Relations are:

The Principal Cognitive Relations that Define Knowledge Use Are:

		OBJECTIVE	SUBJECTIVE
Imposed on Users Via Properties of:	USERS	PSYCHO-INTERACTIONAL IMPERATIVISM	PSYCHO-CULTURAL IMPERATIVISM
	KNOWLEDGE	EPISTEMO-INTERACTIONAL IMPERATIVISM	EPISTEMO-INTERACTIONAL IMPERATIVISM
	SOCIAL SYSTEMS	SOCIO-INTERACTIONAL IMPERATIVISM	SOCIO-CULTURAL IMPERATIVISM
Generated by Users Via Properties of:	USERS	PSYCHO-INTERACTIONAL CONSTRUCTIVISM	PSYCHO-CULTURAL CONSTRUCTIVISM
	KNOWLEDGE	EPISTEMO-INTERACTIONAL CONSTRUCTIVISM	EPISTEMO-CULTURAL CONSTRUCTIVISM
	Social Systems	SOCIO-INTERACTIONAL CONSTRUCTIVISM	SOCIO-CULTURAL CONSTRUCTIVISM

Psycho-Interactional Imperativism

Psycho-interactional imperativism defines knowledge use primarily in objective (interactional) terms and provides explanations that stress phenomena which are imposed on users (imperative) via given psychological properties of users themselves. Mitroff and Mitroff (1979) exemplify psycho-interactional imperativism insofar as their effort to define and explain knowledge use in terms of transactional analysis (TA) and Jungian personality theory, respectively, is based on an "external" explanandum and an "internal" explanans. In order that effective knowledge utilization occur

> it is desirable that the parties be as different on their Jungian profiles as possible. On the other hand, it is critical that they come as close as possible to functioning in the adult mode /posited by transactional analysis/. Difference is called for in Jungian terms so that both parties can challenge their assumptions about what form and type of knowledge is needed so that they can broaden their perspectives... adult functioning is required so that they can benefit from their differences (Mitroff and Mitroff, 1979:214).

Psycho-Cultural Imperativism

Psycho-cultural imperativism defines knowledge use primarily in subjective (cultural) terms and supplies explanations that emphasize phenomena which are imposed on users (imperative) via given psychological properties of users themselves. Campbell's "evolutionary epistemology" comes very close to psycho-cultural imperativism insofar as this "descriptive epistemology"--that is, an epistemology descriptive of man as knower--seeks to explain the evolution of science and other cultural artifacts in terms of psychobiological processes of adaptation and natural selection. In Campbell's words,

> ...man has evolved from some simple unicellular or virus-like ancestor and its still simpler progenitors. In the course of that evolution, there have been tremendous gains in adaptive adequacy, in stored templates modeling the useful stabilities of the environment, in memory and innate wisdom. Still more dramatic have been the great gains in mechanisms for knowing, in visual perception, learning, imitation, language and science. At no stage has there been any transfusion of knowledge from the outside, nor of mechanisms of knowing, nor of fundamental certainties (Campbell, 1974:413).

Epistemo-Interactional Imperativism

Epistemo-interactional imperativism defines knowledge use primarily in objective (interactional) terms and offers explanations that emphasize phenomena which are imposed on users (imperative) via given epistemological properties of knowledge. This perspective has already been illustrated with references to the ideas of Bernstein and Freeman (1975), Wildavsky (1979), and Knott and Wildavsky (1980). A variation of this perspective--but one that assumes the ubiquity of "knowledge" rather than its scarcity or nonexistence--is the "bureaucratic power" model of Rourke: "Bureaucratic power thus reflects the technological revolution and the growing influence of specialized knowledge in modern civilization" (Rourke, 1972).

Epistemo-Cultural Imperativism

Epistemo-cultural imperativism defines knowledge use primarily in subjective (cultural) terms and supplies explanations that stress phenomena which are imposed on users (imperative) via given epistemological properties of knowledge. Toulmin's evolutionary theory of scientific development, based on the analogue of population genetics, explains the growth of knowledge in terms of competing intellectual variants (e.g., theories) carried by scientists in a process characterized by selective diffusion, selection, and retention (Toulmin, 1972). Popper's evolutionary epistemology, which posits a natural trial-and-error process of selecting theories whose epistemological properties make them more or less fit to solve empirical puzzles, also exemplifies epistemo-cultural imperativism (Popper, 1972; Campbell, 1974:436).

Socio-Interactional Imperativism

Socio-interactional imperativism defines knowledge use primarily in objective (interactional) terms and offers explanations stressing imposed phenomena that operate via given characteristics of social systems. Among the many illustrations of socio-interactional imperativism is the "bureaucratization of inquiry" model put forth by Rich (1979, 1981). In contrast to perspectives that stress characteristics of knowledge as a key factor in knowledge use, the bureaucratization of inquiry perspective assumes that

> the characteristics of knowledge are a necessary but not sufficient condition in accounting for the application and utilization of scientific knowledge. This view of the problem stipulates that the bureaucratization of the knowledge inquiry system--the production, process, and use of information--is the critical variable for understanding levels of utilization and nonutilization... "Bureaucratization" refers to issues of internal agency control and ownership as superseding all other considerations... Thus, according to this perspective, one would affect change in the knowledge inquiry system by influencing bureaucratic rules and procedures--not knowledge and/or policy/sector specific characteristics (Rich, 1979:328-329; Rich, 1981).

Socio-Cultural Imperativism

Socio-cultural imperativism defines knowledge use primarily in subjective (cultural) terms and supplies explanations that stress phenomena which are imposed on users (imperative) via given characteristics of social systems. An appropriate illustration of socio-cultural imperativism is Wilensky's treatise on "organizational intelligence" (Wilensky, 1967). Addressing "institutional threats to the reasoned use of knowledge," Wilensky explains variations in organizational intelligence by emphasizing phenomena imposed on users via given characteristics of complex organizations and their environments: "The more an organization is in conflict with its social environment or depends on it for the achievement of its central goals, the more resources it will allocate to the intelligence function and the more of those resources will be spent on experts..." (Wilensky, 1967:10).

Psycho-Interactional Constructivism

Psycho-interactional constructivism defines knowledge use primarily in objective (interactional) terms and offers explanations that emphasize phenomena which are generated by users (constructed) via dynamic psychological properties of users themselves. Etheridge's recent overview (1979) of theory and research on government learning outlines, among other perspectives, a dynamic "bureaucratic dependency theory":

> Dependent people tend to be fearful of, and to resist, change... They may have a greater need for leaders to define reality, lead, and think for them... be more prone to stress, complain without being constructive, tend to wait for other people to solve problems. They may also be prone to symbolic politics rather than substantive problem-solving... dependency can be induced and sustained by bureaucracies and need not be solely a personality trait (Etheredge, 1979:38-39).

Psycho-Cultural Constructivism

Psycho-cultural constructivism defines knowledge use primarily in subjective (cultural) terms and supplies explanations that stress phenomena which are generated by users (constructed) via dynamic psychological properties of users themselves. The definition of government learning proposed by Etheredge, 1979:4, while it includes "behavioral effectiveness" as an objective (interactional) property of knowledge use, emphasizes "increased intelligence and sophistication of thought..." In offering explanations of knowledge use as "government learning" Etheridge relies heavily on theories of active learning created within developmental psychology:

> Developmental theorists...see people as fundamentally seeking for--and often achieving--further qualitative personal growth or development, an achievement which is partly facilitated or blocked by their environment. This developmental, so-called rationalist, tradition holds an active, constructionist view of learning, believes there are innate capacities and predispositions of the mind to make independent sense out of the world, capacities for active internal processing, self-reflection, and qualitative transformation of understanding and competence autonomous from external hedonistic incentive systems (Etheridge, 1979:27-28).

Arguing that organizational learning can be indexed to individual learning--mainly by focusing on "the intelligence and sophistication of thought which informs decisions, policies, and programs"--Etheridge nevertheless punctuates several special requirements of government learning: adequate internal learning systems; consultative and adversarial procedures involving external critics; organizational memory; and "the embodiment of new understandings or revised policies in the action and understanding of people throughout the organization" (Etheridge, 1979:9-10).

Epistemo-Interactional Constructivism

Epistemo-interactional constructivism defines knowledge use primarily in objective (interactional) terms and provides explanations that stress phenomena which are generated by users (constructed) via dynamic properties of knowledge. Weiss' platform for a new social sociology of knowledge applications--that is, a sociology of knowledge "turned upside down" (see Holzner, 1978:8)--is principally concerned with the effects of frames of reference on decision making (Weiss and Bucuvalas, 1980:25). Identical or closely related perspectives are evident in work on "knowledge systems" (Holzner and Marx, 1979), "theories-in-use" (Argyris and Schon, 1974; Zaltman, 1977), "strategic assumptional analysis" (Mason and Mitroff, 1981), and "reforms as arguments" (Dunn, 1981).

Epistemo-Cultural Constructivism

Epistemo-cultural constructivism defines knowledge use primarily in subjective (cultural) terms and provides explanations that emphasize phenomena which are generated by users (constructed) via dynamic properties of knowledge. Laudan's theory of scientific progress approximates the meaning of epistemo-cultural constructivism insofar as its principal focus is on the development of new scientific theories as a consequence of competing rational standards or rules for certifying and challenging the adequacy of knowledge claims (Laudan, 1977). While scientific theories are underdetermined by data, this does not entail the conclusion that knowledge claims are properly explained solely or even primarily in terms of externally imposed "sociological" factors (Laudan, 1981).

Socio-Interactional Constructivism

Socio-interactional constructivism defines knowledge use primarily in objective (interactional) terms and provides explanations that stress phenomena which are generated by users (constructed) via dynamic properties of the social systems of which users are members. Lindblom and Cohen (1979) equate knowledge use with "social problem solving," that is, "processes that are thought to eventuate in outcomes that by some standard are an improvement on the previously existing situation.... For us, 'solve' does not require an understanding of 'the problem' but only an outcome..."(4). "Problem solving" defined in this way, is then explained primarily in terms of social processes that are interactive, pluralistic, and incremental (see Lindblom, 1980). In their words:

> Information and analysis constitute only one route among several to social problem solving....a great deal of the world's problem solving is and ought to be accomplished through various forms of social interaction that substitute action for thought, understanding, or analysis. Information and analysis are not a universal or categorical prescription for social problem solving. In addition, PSI /Professional Social Inquiry/ is only one among several analytic methods, because other forms of information and analysis--ordinary knowledge and casual analysis foremost among them--are often sufficient or better than PSI for social problem solving (Lindblom and Cohen, 1979:10).

Socio-Cultural Constructivism

The last ideal-typical perspective yielded by our expanded typology is socio-cultural constructivism. Socio-cultural constructivism defines knowledge use primarily in subjective (cultural) terms and provides explanations that stress phenomena which are generated by users (constructed) via dynamic properties of social systems. This perspective is evident in much research on "conceptual " uses of social science knowledge by policymakers (see C. Weiss, 1977:15-16), including so-called "enlightenment" models of knowledge use (e.g., Rose, 1977; Cohen and J. Weiss, 1977) and those which stress "ideology" in the classic sense of false consciousness (Mills, 1959; Habermas, 1970; Gregg *et al*., 1979). Representative expressions of socio-cultural constructivism, as that perspective is characterized here, may be found in Rein and Schon's overview of problem setting in policy research (1977) and in general treatises on the role of social science in public policymaking (e.g., Rein, 1976; Rein and White, 1977). Rejecting a narrow and instrumentally oriented conception of problem solving, Rein and Schon propose instead that the process of policy development

> ...is essentially about a process of *problem setting*; it is concerned with developing new purposes and new interpretations of the inchoate signs of stress in the system that derive from the past.
>
> Policymakers use research as an instrument to legitimate action in perpetual striving for consensus of belief and for organization of the fine structure of government action; policy may influence the research agenda more than research influences the direction of policy (Rein and Schon, 1977:235, 236).

In summary, there are at least twelve ideal-typical perspectives of knowledge use now available to enhance our understanding of the role of policy research in social problem solving. Each of these twelve perspectives, it should again be emphasized, is an "ideal" or "extreme" type in the sense that it represents a one-sided accentuation of a particular set of standards for assessing knowledge use which is part of a wider universe of diverse and frequently conflicting views about knowledge and its practical uses. While the basic and extended typologies described above are artificial entities, as indeed all intellectual constructs must be, they capture many of the most important perspectives now prevalent in the field.

The contributions of different theorists have been used to illustrate each ideal type; ideal types, therefore, are not intended as methodological generalizations about theorists whose own research typically evidences a great deal more complexity than a given ideal type can possibly capture. Nevertheless, this process of strategic typification is a reasoned one that deliberately circumvents unproductive disciplinary labels (e.g., "political," "economic," "sociological," "philosophical"), prematurely specified distinctions (e.g., "conceptual" versus "instrumental" use), and doubtful hypothesis and empirical generalizations (e.g., "knowledge use is a function of the 'quality' or 'authenticity' of knowledge and its availability to policymakers."). Instead, the basic and extended typologies are intended to uncover and raise to a level of explicit consciousness the most basic theoretical properties of an emerging but understandably complex and tangled field.

CRITICAL CONSTRUCTIVISM: A METATHEORY

The twelve theoretical perspectives outlined in the last section may be investigated in several different ways, depending on what standards of assessment we wish to employ in appraising them. One investigative strategy is to assess theories in terms of their empirical content, for example, by aggregating or otherwise reviewing available research findings that seem to oppose or support their claims, underlying assumptions, and hypotheses (see Rogers and Shoemaker, 1971; Rothman, 1974; Bernstein and Freeman, 1975; Yin and Heald, 1975; Dunn, 1980). This strategy, while useful for some purposes, is likely to prove highly unsatisfactory as a vehicle for improving theories of knowledge use. We are likely to find that available studies are essentially incommensurable (see Larsen, 1981), not only or even primarily because there are discrepancies in procedures for measuring or "calibrating" variables, but because available studies reflect unresolved basic theoretical conflicts among those who have conducted them. Under these circumstances it would come as no surprise that we are presently unable to generalize any contemporary theories of knowledge use or planned change (Berman, 1981).

Another investigative strategy is to assess theories in terms of their logical properties, for example, by examining their scope, simplicity, consistency, determinacy, and level of abstraction (Wallace, 1971; Popper, 1961; Merton, 1967). While the logical properties of theories are indeed important, this strategy is inappropriate under conditions where we do not know what to explain--that is, where we have not yet decided how to define knowledge use itself. Indeed, this formal logical strategy, when combined with empirical standards for assessing theories, is itself a theory of knowledge use that parallels in most respects what has been described as "epistemo-cultural imperativism." An interest in empirically confirmed and logically consistent propositions reflects a special technical definition of knowledge and our own preferred mode of explaining why we will (or will not) use knowledge conveyed by a given theory.

A third strategy of investigation might involve some combination of historical and social-psychological analysis. Here we might focus on the sociohistorical or psychological bases of theories, or the wider research traditions of which they are part--for example, by examining the professional incentive systems that promote and retard the acceptance of given perspectives or the psychological traits of theorists themselves. Apart from the present impracticality of this alternative, we should recognize that this strategy would also commit us to particular theories of knowledge use--that is, we would necessarily be applying standards of assessment that fall within the scope of "imperativist" perspectives that emphasize social system-specific explanations.

The point is that each of the four basic perspectives and their differentiated subtypes may be used to derive standards of assessment for appraising all other perspectives, including the reflexive application of a theory to itself. While this observation may seem unnecessarily abstract or convoluted, it also yields an important practical insight: Each theoretical perspective may be viewed as a theory-in-use that actually affects the behavior of diverse knowledge users. Thus, we can take each perspective as a "datum" that constitutes a frame of reference and component underlying standards for assessing "usable knowledge" (see Zaltman, 1981; Holzner and Fisher, 1979; Dunn, 1981). Here we will focus on the different ways that theorists themselves "construe" knowledge use, rather than on external conditions that may seem to make theories imperative. Yet if we wish also to assess or evaluate theories, that is, reflect critically on their underlying assumptions, we require standards of assessment that are not also part of the class of standards intrinsic to the theories themselves: "Whatever involves *all* of a collection must not be one of the collection" (Whitehead and Russell, 1910:101; Watzlawick *et al*., 1974:6). In short, what is required is a metatheory of knowledge use, a "theory of theories" that is not itself one of the collection.

The remainder of this section outlines the main contours of "critical constructivism," a metatheory whose eclectic multidisciplinary origins lie in the sociology of knowledge applications (Holzner and Marx, 1979; Weiss and Bucuvalas, 1980), the psychology of personal constructs (Kelly, 1955), the politics of interactive decision making (Lindblom and Cohen, 1979), and the philosophy of argumentation and practical discourse (Toulmin, 1959; Toulmin, Rieke, and Janik, 1979; Willard, 1980; Mason and Mitroff, 1981). In pursuing this aim I shall economize by presenting a series of propositions and corrolaries that are specified in terms of users, knowledge, and social systems, that is, according to the three main subdivisions of the extended typology of theories presented in the last section.

Users

1. Knowledge use is a systemic cognitive relation structured by the ways that users anticipate events (Kelly, 1955).[8] Knowledge use is systemic in the sense that cognitive relations between two or more actors are interdependent. Interdependency renders such terms as knowledge "transfer" (Glaser, 1973) and "translation" (Lazarsfeld and Reitz, 1975) inappropriate; the term "transaction" captures the essence of cognitive interdependency (Zaltman, 1979). Interdependency is nevertheless a property of cognitive relations, that is, of joint occurrences based on the act or faculty of knowing. For this reason "production" metaphors that yield distinctions among producers, disseminators (linkers), and users are at best misleading. Cognitive relations are seldom based on spatiotemporal proximity, since "enlightenment" (Cohen and J. Weiss, 1977) is rarely bound by overt behavioral relations and motor interaction. Yet cognitive relations "are not formless but structured, the structure both facilitating and restricting a person's range of activities" (Bannister, 1962:105; Kelly, 1955). The anticipation of events is purposive or teleological, oriented towards the construction of future reality (cp. Holzner, 1968).

1.1. Users differ from each other in their construction of events (individuality corollary). Users differ "not only because there may have been differences in the events which they have sought to anticipate but also because there are different approaches to the anticipation of the same events" (Kelly, 1955). The distinction between "objective" and "subjective" behavior--between "externally" imposed and "internally" generated realities--is unnecessary and redundant. As a "unit act" knowledge use is constituted by a dialectical conjunction of subject and object; objective behavior relations alone are never representative of knowledge use. Theories of "instrumental" use, when they exclude the construction of events, are not theories of *knowledge* use; theories of "conceptual" use, when they exclude events that are constructed, are not theories of knowledge *use*.

1.2. *Users evolve for their convenience in anticipating events a construction system or frame of reference embracing ordinal relationships among constructs (Organization Corollary)*. Users differ not only in their constructions of events but also "in the ways they *organize* their constructions of events" (Kelly, 1955). Organized construction systems or frames of reference may be characterized in terms of their internal consistency and hierarchical complexity. What are called "reality tests"--that is, standards for assessing the adequacy, relevance, and cogency of knowledge claims (Holzner and Fisher, 1979; Weiss and Bucuvalas, 1980; Dunn, 1981)--reflect complex ordinal relationships among constructs.

1.3. *Users choose for themselves constructs through which they anticipate the greater possibility for the definition and extension of their frames of reference or construction systems (Choice Corollary)*. "Definition is the name given to the system's becoming more explicit and clear cut in constructing elements already subsumed; extension is the name given to the system's becoming more comprehensive so that it may subsume new elements" (Bannister, 1962:107). A researcher's decision to maximize internal and/or external validity (Cook and Campbell, 1979) is an illustration of the difference between definition and extension, respectively, as is the distinction between "micropositive" and "macronegative" policy research (Williams, 1971).

1.4. A construct is convenient for the anticipation of a finite range of events (Range Corollary). Users may construe "effective" policies versus "ineffective" ones, but will not find it convenient to construe "effective" versus "ineffective" research findings, since research findings are typically outside the range of convenience of the construct "effective-ineffective."

1.5. A user's construction system or frame of reference changes as he successively construes replications of events (Experience Corollary). The constructions one places upon events are "working hypotheses" which are put to the test of experience. A user's "anticipation or hypotheses are successively revised in the light of the unfolding sequence of events a construction system undergoes..." (Kelly, 1955). For this reason, policy problems do not stay solved; they are redefined and even "unsolved" (Ackoff, 1974).

1.6. The change in a user's construction system or frame of reference is limited by the permeability of the constructs within whose range of convenience the changes lie (Modulation Corollary). "A construct system is free or determined with respect to its permeability" (Bannister, 1962:108). The more permeable a user's superordinate constructs--for example, those associated with underlying assumptions or a worldview--the more likely he will be able to change subordinate elements of a construct system or frame of reference. Permeable and impermeable constructs may be illustrated by considering the relatively great flexibility of theories, as distinguished from hypotheses, and of policy problems as compared with policy alternatives or the decision rules used to select them. This distinction is also evident in contrasts between ill-structured and well-structured problems (e.g., Raiffa, 1968; Mitroff, 1974) and problem-solving and problem-setting models of policy research (Rein, 1976; Rein and Schon, 1977).

1.7. Users may successively employ subsystems of constructs that are incompatible (Fragmentation Corollary). Incompatible subsystems of constructs are evident only when they are directly compared; incompatibilities disappear when a subsystem is linked to a superordinate system. For example, policy researchers may contend that the provision of more jobs to the unemployed will lead to riots and other civil disturbances. The appearance of self-contradiction is based on an inference from a single subsystem according to which more jobs create more satisfied people. Once jobs and riots are linked to the superordinate construct of "relative deprivation" (the perceived gap between rising expectations and fixed capabilities) the apparent incompatibility disappears. Single subsystems of constructs, including various "reality tests," are unreliable predictors of subsequent action unless we also know the superordinate construct systems of which they are organized components--namely, assumptions matter (Mason and Mitroff, 1981).

1.8. To the extent that one user's construct system or frame of reference is similar to that employed by another his cognitive processes are similar to those of the other user (Communality Corollary). We should expect similarities in cognitive processes between users with similar construct systems, even when they experience different events, rather than expect similarities in cognitive processes between users experiencing the same events. Thus, what we experience as policy problems are products of thought acting on external events or environments (Ackoff, 1974), such that the communality or conflict among users' frames of reference governs the structure of policy problems.

1.9. To the extent that one user construes the construction process of another he may play a role in a social process involving the other user (Sociality Corollary). To construe the construction processes of another is not necessarily to use identical constructs, or employ the same frame of reference, but "to possess constructs which

> assume another's within their range of convenience" (Bannister, 1962:110). Thus, for a social scientist to play a role in the social processes of a policymaker who believes that the enforcement of law and order will reduce crime does not involve the social scientist in simply adopting and translating these constructs into a researchable problem, but requires the social scientist to emply constructs that subsume those of the policymaker--for example, by showing that poverty subsumes law and order and crime.

Knowledge

2. Knowledge is a cultural artifact established through transactions among construing users. Although knowledge is knowledge to anyone who takes it as a basis for some commitment to action (Lindblom and Cohen, 1979), knowledge is structured by the construction systems or frames of reference of different users. To the extent that users construe the construction processes of other users they are involved in a transactional cognitive relation where two or more parties reciprocally affect, through argument and persuasion, the acceptance and rejection of knowledge claims. Thus, knowledge is not "exchanged," "translated," or "transferred," but transacted among users who constructively negotiate the truth, relevance, and cogency of knowledge claims (Dunn, 1981). Hence, to "use" knowledge is to anticipate events by construing their replications.

2.1. The adequacy of a knowledge claim is a function of its assimilability within a user's superordinate construction system (Adequacy Corollary). The adequacy or "truth" of a knowledge claim depends on the extent to which it may be assimilated within a superordinate construction system, that is, a construction system that warrants a claim as plausible by virtue of subordinate status within the construct system (cp. Toulmin, Rieke, and Janik, 1979). Superordinate construction systems may be causal, teleological, empirical, pragmatic, ideological, ethical, or authoritative (Dunn, 1981). "Reality tests" (Holzner and Marx, 1979) are particular types of superordinate construction systems.

2.2. The relevance of a knowledge claim is a function of its range of convenience to users in anticipating events (Relevance Corollary). Knowledge claims, apart from their adequacy, may lie outside a user's range of convenience in anticipating events. Thus, a causal claim about the effects of early childhood education on subsequent achievement may be assimilable within a superordinate construct system (e.g., a theory of achievement motivation), but lie outside the range of convenience of users who anticipate socioemotional development of children. "Relevance" and "utility" tests (Holzner and Fisher, 1979; Weiss and Bucuvalas, 1980) are particular representations of a user's range of convenience.

2.3. The cogency of a knowledge claim is a function of the requisite force expected of a construct system in anticipating particular events (Cogency Corollary). Construct systems vary in the degree to which they anticipate events. When claims are construed as adequate by virtue of their assimilation into a superordinate construct system, the construct system may lack the requisite force expected in anticipating certain events. Particular events may evoke "conservative" or "liberal" expectations about the requisite force of a construct system in anticipating events. For example, physicians and lawyers differ in their presumptions about sickness and guilt and the need to treat or protect clients. "Cogency tests" establish the requisite force expected of a construct system in anticipating events.

Social Systems

3. *Social systems are artificial entities whose creation, maintenance, and transformation is a function of knowledge transactions*. The social systems in which knowledge use takes place are dialectical entities: "Society is a human product. Society is an objective reality. Man is a social product" (Berger and Luckmann, 1967:61). For this reason explanations of knowledge use that stress imposed or generated social phenomena are one-sided and incomplete representations of one or another complementary property of social systems. What we know as "markets" and "bureaucracies" are artificial entities whose consequences are nevertheless real or natural for those who participate in their creation, maintenance, and transformation through knowledge transactions (cp. Knott and Wildavsky, 1980). Similarly, what we know as "social experiments" or an "experimenting society" (Campbell, 1971) are symbolically mediated change processes involving the transaction of new social arrangements, rather than the discovery of experimental outcomes that are independent of the preferences of investigators. Reforms, therefore, are better visualized as arguments (Dunn, 1981) than experiments (Campbell, 1975, 1979). Arguments are naturally occurring corollaries to research contexts; every user conducts his own research act (Willard, 1980).

3.1. *The performance of social systems in achieving collective goals is a function of the degree to which shared construction systems or frames of reference successfully anticipate events (Rationality Corollary)*. Rationality is a property of the construction systems and behavior of individual and collective users; there are as many types of rationality as there are construction systems in society. Attributions of rationality, irrationality, or non-rationality to social systems (Lindblom, 1980; Wildavsky, 1979) are products of the construction systems of analysts rather than those of users about whom analysts generalize. It is in this sense that rationality is "situated" (Simon, 1976) or "indexical" (Knorr, 1981).

3.2. The success of social systems in anticipating events is a function of the hierarchical complexity, permeability, and integration of collectively shared construction systems or frames of reference (Capacity Corollary). The successful anticipation of events depends on the number of superordinate constructs in a construct system, their permeability, and integration. Whereas rationality is a property of self-construed effective behavior or performance in anticipating events, collective learning capacity (e.g., government learning) is a structural property of shared construction systems. In this sense "increased effectiveness cannot, by itself, index increased learning" (Etheredge, 1979:5).

3.3. The freedom to make collective choices that successfully anticipate events is a function of collective learning capacities (Emancipation Corollary). Collective construction systems or frames of reference are constituted, in part, by theories--that is, "higher order abstractions by which we gain freedom from the particularities.... The theories comprise prior assumptions about certain realms of the events. To the extent that these events may, from these prior assumptions, be construed, predicted, and their relative courses charted, men may exercise control, and gain freedom for themselves in the process" (Kelly, 1955:22). Accordingly, a "rational" society (Habermas, 1970), or one where social scientists contribute to "enlightenment" (C. Weiss, 1977; Cohen and J. Weiss, 1977), is an emancipatory one. In the last analysis knowledge use is about freedom and human control; the "dependent variable" or phenomen-to-be-explained is not instrumental rationality, or even collective learning capacities, but emancipation.

CONCLUSION

In an attempt to untangle the field of knowledge use I have constructed an extended typology designed to capture the most basic properties of present-day theories of knowledge use. Rather than side with any particular theory, or an ideal-type of which it is an illustration, I have instead attempted to take each theory as a "datum." Since most theories are internally fragmented or underspecified it is difficult to explore their assumptions (propositions, hypotheses) with the aim of uncovering complementarities or new opportunities for synthesis that arise from theories themselves.

The analysis therefore shifted to a metatheoretical level where three propositions and fifteen attendant corollaries serve as bases for making statements about ideal-typical theories as a whole. This procedure satisfies the condition that "whatever involves all of a collection must not be one of the collection" (Whitehead and Russell). The most important conclusion is that the "dependent variable" or phenomenon-to-be-explained is not instrumental rationality, or even collective learning capacities, but emancipation.

NOTES

[1] By theoretical perspective I mean a loosely organized set of claims and underlying assumptions that provide not only a "way of viewing" knowledge use, but also a commitment to define and explain the phenomenon in specific ways. I thus avoid, for reasons that will become clear, more restrictive definitions of theory as a systematically organized and logically connected set of propositions designed to explain or predict some class of phenomena. The terms "theory," "theoretical perspective," and "perspective" are used interchangably in the first three sections of the paper.

[2] These questions, along with the methodology used to compare and contrast theories (or theoretical perspectives), are based on Walter Wallace's fine attempts to map the domain of sociological theory (Wallace, 1969; 1971).

[3] Specialized fields devoted to the study of cognitive relations have also grown out of several disciplines, including the sociology of science (Merton, 1973), the sociology of knowledge applications (Holzner and Marx, 1979), qualitative sociology (Schwartz and Jacobs, 1979), cognitive psychology (Hayes, 1978), and the psychology of science (Fisch, 1977).

[4] The objective-subjective behavior distinction is, of course, somewhat ambiguous. One source of ambiguity, as Wallace (1969:7) observes, is the technical difficulty of directly observing subjective behavior (e.g., knowledge, attitudes, values). An equally important source of ambiguity (one Wallace does not mention) is the technical difficulty of determining whether objective behavior does or does not reflect particular cognitive properties--for example, knowledge of particular policy recommendations or the findings of program evaluations. For this reason Merton (1949), Suchman (1972), Weiss (1977), and Rein and White (1977) have called attention to the "latent" goals of policy research. In short, it is even more difficult to make inferences about "knowledge use" from objective behavior than it is from subjective behavior. A solution for this problem may be found in a metatheory that posits a dialectical relation between behavior now distinguished as "objective" versus "subjective", "conceptual" versus "instrumental," "intellectual" versus "social," and "cognitive" versus "interactive" (see Section 4 below).

[5] Machlup's definition of knowledge use as a subjective cognitive relation leads him to conclude (erroneously I think) that "Operational definition of use is practically impossible..." (1979:64).

[6] This quotation, and others like it, should be sufficient to convince the doubting reader that the term "objective cognitive relation" is not a self-evident contradiction. While we may disagree with such definitions it is important to recognize that many observers assume (most often implicitly) that objective, observable, and overt behavior is indicative of some cognitive relation--namely, one that is based on the subjective act or faculty or knowing.

[7] Wallace (1969:11-13) juxtaposes the terms "determined" versus "free-willed," while others (e.g., Rein, 1976) reintroduce the classic "nomothetic-idiographic" distinction. Strasser (1976), in distinguishing "social-technological" and "social-emancipatory" explanations, provides a more powerful and conceptually rich schema that addresses the role of critical or reflective properties of explanantes of theories.

[8] This subsection draws heavily on personal construct psychology and the theory of "constructivist alternativism" (Kelly, 1955). Some of Kelly's corollaries have been excluded from this presentation. For extensions and interpretations of Kelly's work, including research applications in mental health, marketing, and other areas, see Frost and Braine (1967), Bannister and Mair (1968), and Stringer and Bannister (1979).

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VIII CONSTRUING KNOWLEDGE USE

Gerald Zaltman

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ABSTRACT

This paper discusses selected constructs of the term "use" and the complexity that may be concealed by oversimplistic imagery. The way in which knowledge use is construed may influence attempts at measurement. Improvement in measurement techniques may result from increased differentiation in the way we think about use, particularly as distinct from impact, as well as from more imaginative strategies for measurement.

Introduction

The study of knowledge use is about to come of age after a long period of creative nurture. The field is coming of age for at least the following reasons: (1) it is receiving the active attention of an increasing number of serious scholars in many disciplines; (2) it is increasingly recognized as an important issue by the knowledge application community consisting of policy makers and practitioners in a wide variety of public and private sector agencies; and (3) a number of well established areas (such as technology transfer, R & D management, innovation adoption and diffusion, policy analysis, and so forth) are displaying increasing common foci, which in turn overlap with those of concern to people in the knowledge use area thus further enriching the intellectual base of the field.

There exists, however, a serious brake or inhibitor to the further development of the field. The effects of this difficulty are equally important for all groups which have a stake in knowledge production and application. The difficulty is easily described: We are generally lacking an adequate understanding of what is meant by the term "use" even though it refers to one of the most if not the most crucial concept in the field (cf. Weiss, 1981; Larsen, 1981). This concept is often the dependent variable in both explanatory and normative or prescriptive models of knowledge use phenomena. The term is often conceptualized and measured in diverse and frequently poorly specified ways by different people whether it is treated as a dependent, independent or intervening variable. Clarification of this concept is one of the most pressing needs in the field (Rich, 1979; Larsen, 1980).

"Doing Before Knowing"

If we are to better understand the phenomena of knowledge use for purposes of explanation, prediction or control it is essential that a better understanding be achieved about the nature of the concept of use and its measurement. If we do not understand this concept well we will not understand any better those phenomena knowledge use itself influences. Neither will efforts made to understand variables affecting the use of knowledge be fruitful if the ultimate dependent variable is not clearly understood and is improperly measured. This is the familiar paradox of conceptualization (Kaplan, 1964) found in developing fields. Good concepts are needed for good theory but good theory is needed for good concepts. The paradox can be solved by a process of approximation. However, even this may be difficult or premature in a field such as knowledge use. In this instance an approach labelled by Charles Jones (1974) as "doing before knowing" may be required. This approach involves a careful plunge into concept development and modification. It is the approach followed in this paper.

A basic assumption of this paper is that there exists multiple dimensions and hence multiple conceptualizations of the term "use." These dimensions may not necessarily cluster in a manner which suggests that there is a single multidimensional concept. The possibilities range from a large number of one dimensional concepts of use to a modest number of multidimensional concepts of use, to a single multidimensional concept. No matter how the term "use" is conceptualized there are undoubtedly multiple ways of measuring it. This paper will explore possible dimensions of the term "use" and comment on certain measurement problems.

Knowledge-In-Use and Frames of Reference

Let me identify at the outset certain percpectives I hold which may have influenced the selection here of particular dimensions and measures of knowledge use. First, I believe a substantial proportion of all research is largely concerned with exploring systematically and in further detail what is already known on the basis of commonsense experience among some relevant subset of a population. Research often follows practice. This is obviously the case when research attempts to explain observed behavior. It is also the case, however, when research attempts to improve upon practice or behavior. For example, probably some teachers already knew the advantage of individualized instruction or the limitation of particular teaching methods prior to their exposure to formal research relating to these issues. And, of course, many teachers did not. Undoubtedly, many teachers and administrators knew that leadership style affected children's behavior prior to their (the teachers') awareness of Lewin, Lippit and White's (1939) famous study of autocratic, democratic and laissez-faire leadership styles. The rather rapid and visible acceptance of this study in education (Getzels, 1978:482) was probably made possible by a relatively widespread intuitive knowledge of one or another aspects of this study. Efforts to explore theories and knowledge-in-use are ways of eliciting in a manner which permits careful theoretical analysis what is known on a commonsense basis. One implication of this perspective is that core ideas found in research are already in at least limited use and therefore the major impact of research may often be to support certain practices, facilitate their dissemination by providing important and timely validation, and to provide more detailed and refined insight into practices. This also means that direct linkages between research and practice are more difficult to establish. It is paradoxical that the organic relationship between research and practice poses this dilemma. This leads to another related perspective.

My second perspective is that most knowledge has its primary impact on our frames of reference or coding schema. Again, this is more obviously the case for so-called theoretical research. But I believe it is also the case (although perhaps less obviously) for so-called applied research. A particular research finding or even a set of findings produced by several researchers should not be expected to have a direct impact on practice. The asking for evidence of direct impact reflects a construal of knowledge use which accurately reflects only a limited number of circumstances. It does not reflect the more frequent way knowledge is used. Even though examples of direct impact are available (cf. Getzels, 1978:480-489), it is naive to expect to find widespread evidence (and therefore to ask for evidence) of the direct impact of research on practitioners. As Caplan et al (1975) suggest in reference to policy makers, the importance of a research idea for a policy maker "lies in its ultimate integration into his entire perspective on a problem. In asking him to cite instances of (research use) he is really being asked to atomize his conception of social reality, to take knowledge out of its context, a context without which the knowledge would not have been retained in the first place" (Caplan et al, 1975:18). An important implication of this observation is that for research to have an impact it must be reasonably consistent with users' frames of reference. Ralph W. Tyler (1978:97), who prefers the term "cognitive map" to frames of reference, makes this important observation:

> "New research is likely to produce new concepts and generalizations or give different emphasis to old ones. Practitioners may hear about them or read about them, but they are not likely to incorporate them into their maps unless they meet one or both criteria--consistency with the reality they perceive, and/or providing guidance for more effective performance of their tasks. The criteria of internal consistency and parsimonious explanation, which are important to researchers, appear to have little significance to the practitioner, and this is often the reason why some research reports are given little attention by practitioners and evoke no changes in their behavior."

It is difficult to assess the frequency with which encountered research is consistent with our frames of reference. There is good reason to think that only infrequently does research have a major impact on our frames of reference (Tversky and Kahneman, 1980; Lord, et al, 1979; and Ross and Lepper, 1980). This relates to a third perspective which is that the probability of research altering frames of reference is very low. There is a multiplicative relationship among at least the following probabilities: The probability that research will yield information which is valid (i.e. knowledge); the probability that such research or knowledge will be disseminated to potential users; the probability of its being accepted; and the probability of its being implemented. (As we shall see in the next section, there are many other factors to consider.)

Factors Influencing the Use of Knowledge

Before examining the construct of knowledge use in any detail it will be useful to identify several factors which may influence the conceptualization and measurement of use in any one situation. The term measurement is employed here to refer to the level or degree of use made of an item of knowledge. I am not referring to measurement issues related to the determination of the validity of various knowledge use constructs. Before the issues of measuring construct validity can be addressed we need to have clearer ideas of what the possible constructs are whose validity should be assessed. The use made of knowledge is influenced by at least the following factors:

A. The content of knowledge.

B. The source of knowledge.

C. The communication channel through which knowledge is disseminated.

D. The means whereby the knowledge was produced.

E. Circumstances pertaining to the potential user of the item of knowledge. (These circumstances may range from the organizational environment of a school to the information processing style of a teacher or school administrator.)

F. Motivation to use or not use the item of knowledge.

G. The original purposes for which the item of knowledge was generated.

H. The need/opportunity for user "value added."

I. The structure of knowledge (independently of its content).

J. The perceived nature of a problem or decision to which knowledge may be applied.

It is not within the purview of this paper to explore systematically how each possible dimension of use may be influenced by the above factors. However, since these are important factors they will necessarily be touched upon at least implicitly in various ways throughout the paper. They are not, however, the main concern of this paper.

Some Simple Illustrative Uses of Knowledge

Before exploring some complicated aspects of knowledge use it will be helpful to first illustrate some less complicated uses which might be made of a single item of knowledge. A sample knowledge item might be that an "interactive research and development on teaching (IR&DT) approach to educational research and development increases in effectiveness when participating teachers have had similar past experiences with regard to innovation developments" (Tikunoff, Ward, and Griffan, 1979:18). This knowledge may be used or not used in the following ways:

1. Persons interested in educational R&D who may wish to try this approach may seek as participating teachers only teachers who have had similar past experiences.
2. Persons who may be required (mandated) to use this approach contrary to their own preferences may deliberately seek as participating teachers only those who have not had similar past experiences.
3. An active researcher in education exposed to the finding may dismiss it because it is perceived to be far too difficult to implement.

4. Teachers who may be invited to participate in an IR&DT endeavor may evaluate their probable satisfaction in terms of whether or not they have had similar past experiences: those without such past experiences might be more inclined to refuse participation given this knowledge.
5. Potential adopters of a particular educational innovation may use as an evaluation criterion whether or not the originating R&D team had teachers with similar past experiences.

It is not difficult to identify for each of the five uses just mentioned (and there are yet others) a set of underlying assumptions and other circumstances that would make each use justifiable from some normative perspective and yet another set of assumptions and circumstances that would make each use unjustifiable perhaps from the same normative perspective. Whether the use made is judged a misuse depends largely upon our awareness of and acceptance of the associated set of assumptions and circumstances.

The first example might be labeled a positive use of knowledge by an R&D manager. Of course, a consequence of employing only teachers with substantial past similar experiences may result in the same teachers being used repeatedly in R&D efforts. These teachers may or may not be representative of other teachers or if representative initially, may lose representativeness over time as they acquire researcher skills and perspectives. Moreover, this approach does not develop appropriate experiences for other teachers. Thus this so-called positive use of knowledge may have negative consequences and therefore could also be considered a misuse of knowledge if not applied judiciously. What appears to be a positive use may in reality involve a negative use of knowledge.

The second example suggests a deliberate misuse of the knowledge. If one assumes sinister intentions and nothing else, this is a tenable suggestion. On the other hand, the R&D manager may have developed an effective alternative system to IR&DT in which the lack of teachers with similar past experiences is an advantage for certain types of innovations. Or, closer to the example, the R&D manager may have valid reasons to believe an IR&DT approach to be inappropriate for a given task, especially where assumptions based on past R&D experiences of teachers may be inhibitory. Thus, to lessen the impact of an improper R&D strategy (as perceived by the manager) the manager will implement it in a way which renders it least damaging. He or she does this by choosing as participating teachers those who because of their limited past experiences are likely to bring fewer inhibiting assumptions to the task situation. The apparent misuse may thus be viewed as an attempt to correct or alleviate the negative consequences of an apparent positive use of the knowledge by the mandating authority.

The third example might ordinarily be considered an illustration of non-use. If we happen to think the idea is a very good one and easy to implement, we might also be tempted to label this as misuse because of our perceptions of the negative consequences of deliberately ignoring a research finding which could have beneficial impact. A more charitable posture might lead us to conclude that the researcher has at least been enlightened since apparently it was not the intellectual quality of the idea but its actionability which was rejected. Or was it? Can we even claim enlightenment? If actionability is a very important truth test for R&D managers (cf. Zaltman and Deshpande, 1979), this particular item, judged to be inactionable, is not likely to become a part of the manager's knowledge inventory. The manager will essentially forget it. There is a substantial literature on selectivity in perceptual bias which focuses on selectivity in retention and motivated forgetting. This research cautions that mere exposure to an item of knowledge is not sufficient to claim enlightenment resulting from that knowledge. Moreover, selectivity in recall suggests that biases in retention may result in unenlightenment as a result of distortion in the original item of knowledge.

In the fourth example, people who are the focus of the knowledge item are making use of it. Teachers with similar past experiences (as they perceive that experience) who decide to participate might be considered to be making positive use of the knowledge. Similarly, teachers who decline participation because they perceive less satisfactory project outcomes or less satisfying personal outcomes may be making positive use of the knowledge. But what if this self-selection process inadvertently yields an excessively homogeneous group of participating teachers when the nature of the task happens to warrant heterogeneity among participating teachers? (Teachers with similar past experiences in educational R&D may share other characteristics in common as well.) Heterogeneity would produce better outcomes and hence more satisfaction among participants. Thus had teachers who self-screened out participated, the outcome might have been above their required threshold of satisfaction for participation. The actual outcomes with homogeneous teachers may be below their required (and anticipated) threshold of satisfaction. From an aggregate sense one cannot say either group necessarily made positive use of the information although as individuals they may have. (The issue of anticipation or expectation will be addressed later.)

The final example concerns potential adopters of an educational innovation who use the item of knowledge as an attribute of an innovation. The "scientific" status of the innovation is partly evaluated by adopters on the basis of perceived use made of other teachers like themselves by the developers of the knowledge item (Whitten, 1975; Altback, 1975). Depending on the adopter's (e.g. teacher's) disposition toward the use of teachers in R&D activity, the use made may differ. A teacher may have legitimate (at least to him or her) reason to dispute the item of knowledge and hence reject an innovation developed in a process which relied on this item of knowledge. Here, of course, what is being called an item of knowledge is not knowledge for the teacher in question. We are likely to misclassify this as non-use of knowledge when in fact it is non-use of data. The knowledge actually being used by the teacher in question is something to the effect that IR&DT decreases in effectiveness when participating teachers have had similar past experiences with regard to innovation development.

A sixth example not specified might refer to derived users (similar in concept to the notion of derived demand in economics). For example, if the knowledge is put into effect students may benefit (or suffer). This refers to an aspect of use which we shall develop later. Another beneficiary would be a funding agency which sponsored the original research on IR&DT and may require subsequent teaching R&D projects it supports to involve teachers with past similar experience in the R&D process.

Still another use of this finding relates to its citation as supportive or nonsupportive evidence concerning user involvement in innovation R&D in various contexts, or its use for other purposes such as the use being made of the knowledge item in this paper.

Construing Use

The following sections will identify several different ways of construing the use of knowledge. Each of these construals are different even if they are partially overlapping or otherwise closely related. Certain measurement issues are touched upon as well. When a "doing before knowing" approach is necessary the intertwining of concept and measurement is especially acute. The danger of unwittingly allowing the concept to be defined by the manner of its measurement must be guarded against. Certainly we do have knowledge about the concept of use. However, the phenomena is very complex and in need of considerable "doing" enlightened by work in decision theory, cognitive psychology, and social change, as well as the sociology of knowledge.

Others have addressed the conceptual and measurement issues of knowledge use. Familiar to all of us is the distinction between instrumental use in which knowledge receives an explicit application and conceptual use in which knowledge primarily affects understanding (Caplan, et al, 1975; Rich, 1977). Carol Weiss (1980) has also identified a variety of uses of research among federal, state and local officials in mental health agencies. These officials found research variously useful in (1) keeping up with the field; (2) providing a scientific aura to reports; (3) legitimating a particular position; and (4) in shaping their understanding of the social world they must deal with. Judith Larsen (1980; 1979) has focused on alternative types of use which include: "revisions of the information; use of selected aspects of the information; revision of the information to fit the user's situation; a decision not to use the information; de facto non-utilization in which the potential user does nothing at all." Larsen has also developed an interesting set of indices relating to use which she combines to form a Utilization Quotient and a variant called the Utilization Sum.

Impact on Expectations

The expression "an idea whose time has come" is an intriguing one. What is that makes an idea timely or untimely? Undoubtedly there are many valid explanations. For example, a problem may increase in severity to a point where a relevant item of knowledge which has been resisted will be applied in an effort to solve the problem. Several illustrations from community health programs can be given involving changes from the use of folk medicine to the use of more modern medical treatment. The inability of folk medicines to halt serious physical deterioration prompts the more drastic behavior (as perceived by the sufferer) of using the services of a government community clinic. Another case would be knowledge about certain procedures to follow in coping with a disaster or emergency. This knowledge isn't practiced until an emergency occurs. A suddenly perceived need to respond to a particular educational problem may prompt closer scrutiny of long existing ideas. This felt need to respond to a problem enhances the likelihood that at least some of these ideas will be tried.

Apart from a change in the perceived severity of a problem, there are other reasons which may account for the relatively sudden use of knowledge. One reason is that a kind of convergent validity occurs. That is, a given item of knowledge is reinforced by knowledge items from other sources. This consistency in information may enhance confidence in the information (Kahneman and Tversky, 1973). For example, certain institutions such as White House Conferences or special commissions may serve not to generate new ideas but to make "more respectable, plausible and thinkable" ideas or knowledge which have been widely disseminated or at least have been in existence for some time (Popper, 1970). The experiences of another school or teacher who has tried the knowledge may reinforce the potential user's perception of the quality of the knowledge. The original idea may be reinforced by non-user evaluations such as reports of researchers who have experimented further with the original idea. Approval of the idea may be expressed by key administrators. The idea may also receive favorable treatment in the popular press. At some point sufficient convergent validity exists and the teacher or school administrator becomes willing to try the knowledge once other necessary enabling conditions (e.g. resources) also become adequate. When such a process occurs among a significant proportion of a given population we hear the expression, "this is an idea whose time has come."

What may be reflected in this expression is an alteration in expectations concerning the consequences of an idea being applied. Users become more confident in the validity and reliability of the idea (however they define validity and reliability). This suggests that knowledge use may be conceptualized and measured in a way which follows Bayesian analysis. The reader may already be familiar with the work of Marcia Guttentag and her associates in applying decision theory to evaluation research (Edwards, Guttentag and Snapper, 1975).

Following this approach, knowledge use could be defined as the change in confidence a person has in a given item of knowledge. First consider a teacher relying on a particular test for diagnosing reading skills. This person reads an evaluation of this test which supports their use of the test. We probably will not observe any change in this teacher's behavior. However, if the teacher is more confident in his or her use of this test then we can claim the evaluation report has been used. The teacher feels more confident. In this instance the report is used to reinforce existing practices. The measure of use is the change in confidence experienced by the teacher. Similarly, if the evaluation caused the teacher to question his or her use of the test, then its use would be measured by the loss in confidence even though there may still be no change in existing behavior. The difference between prior confidence in a given practice or idea and posterior confidence is a measure of knowledge use. When we are focusing on knowledge relating to current practice, it is likely that the change in confidence will be greater when that item of knowledge reinforces rather than questions the relevant practice. This approach to defining use stresses the acceptance as opposed to the implementation of knowledge. The emphasis is on impact on thinking as opposed to demonstrable effects on behavior. In fact, the notion of confidence relates more to the likelihood of acceptance and thus is not a direct measure of this view of use.

In another instance a teacher may be considering the use of a different diagnostic test and encounter an evaluation of that test which is sufficiently supportive to warrant at least trial use of the test. Here we would be inclined to conceptualize and measure use in terms of actual adoption of the test. However, we could still apply prior confidence and posterior confidence measures as well. In fact, this would be more fruitful because it begins to provide an indicator of the threshold level an idea must reach (even if a very context specific threshold) for its "time" to have come. The interesting possibility is raised that we might be able to predict the likelihood of continued use or, conversely, of a discontinuance of the use of the item of knowledge (i.e., the evaluation report's basic message) by the magnitude of the difference between prior and posterior confidence levels once we know what the critical threshold is. Also, independently of the degree to which the threshold is exceeded, the magnitude of the difference between prior and posterior confidence levels will have an impact. This is especially likely when the prior confidence level was well below the required threshold. A significant change within a short time interval raises the possibility of dissonance arising. This would be followed by subsequent seeking of confirmatory information (Zaltman and Deshpande, 1979).

When a significant number of people reach their critical confidence level at about the same time we have an "idea whose time has come." This is represented by the first inflection or take off point on an "S" shaped diffusion curve. Thus in proportional terms what constitutes a significant number of people need not be particularly large.

Unit increments in knowledge may be valued differentially. Thus we may have the kinds of situations displayed in Figures 1a and 1b.

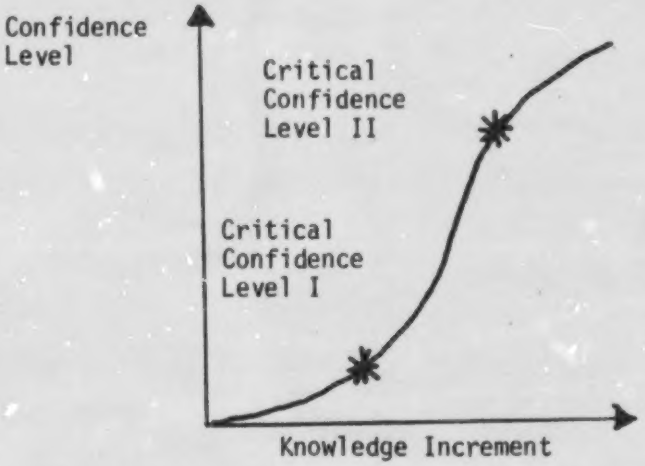


Figure 1a. Differential Valuation of Knowledge Units

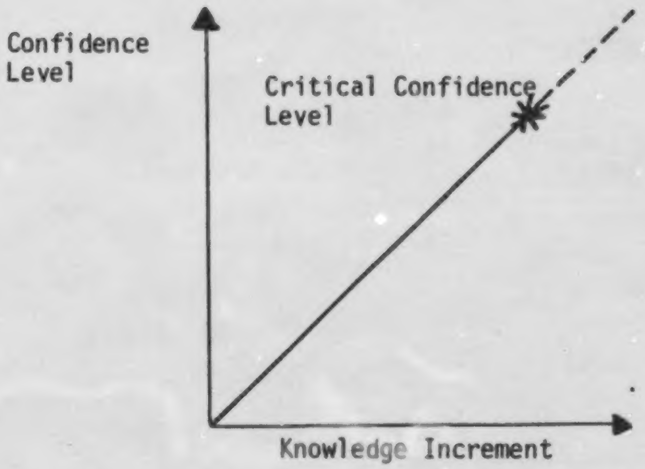


Figure 1b. Equal Valuation of Knowledge Units

In Figure 1a initial knowledge increments have less impact on confidence than to those associated with the take-off or sharp increase in confidence level (Level I) for a population as a whole. After the next critical confidence level (Level II) is reached subsequent increments in supportive knowledge may have less impact. In Figure 1b each increment in knowledge has the same impact on confidence level and hence are valued equally at least up to the critical confidence interval. The critical confidence level could be estimated by a diffusion curve in cases where the knowledge item has a physical manifestation in the form of a test instrument, book, classroom design, etc. If the diffusion curve were a classical "S" shaped diffusion curve then the critical confidence level associated with the "idea whose time has come" is at the point where the so-called early adopters are beginning to accept the practice. This is shown in Figure 2.

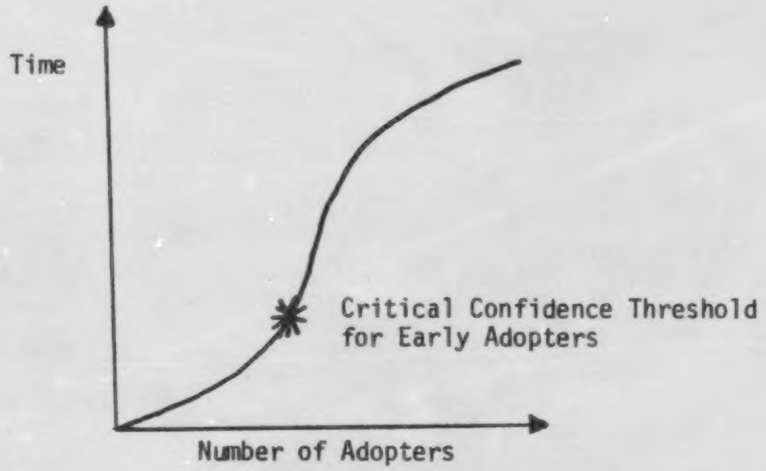


Figure 2. Traditional "S" Shaped Adoption Curve

Figure 2 may be reconceptualized as shown in Figure 3. Figure 3 displays a third dimension representing confidence level. Thus early adopters (EA in

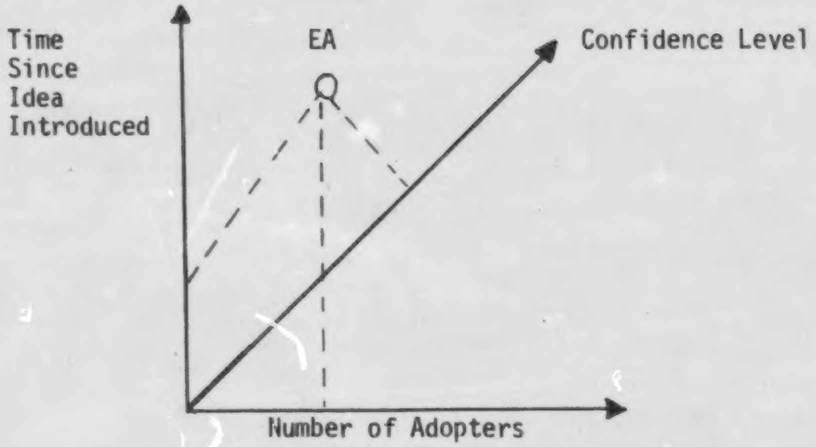
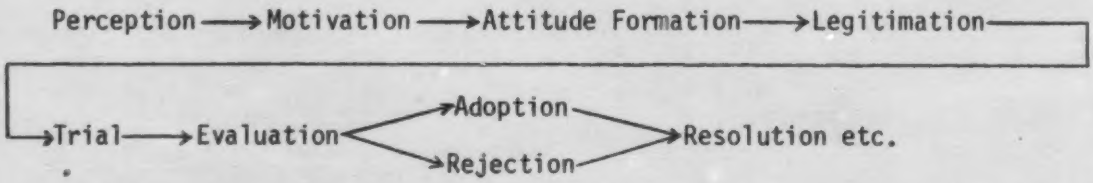


Figure 3. Confidence Level for Early Adopters of Knowledge (Note: The Knowledge Increment dimension is omitted.)

Figure 3) are high in confidence, early in adopting relative to other potential adopters, and early in adopting relative to the time in which the knowledge appeared. A fourth dimension representing increments in knowledge should also be present but is omitted for visual simplicity. Early adopters would probably be represented on the lower end of this dimension approximately corresponding to the point indicated by Critical Confidence Level I in Figure 1a.

An additional perspective may be of further help. The literature on innovation adoption has, for heuristic purposes, distinguished among several different decision making stages (cf. Zaltman and Duncan, 1977; Everett M. Rogers and Floyd Shoemaker, 1971). A simple unidirectional construal of these stages is shown below:


Perception
Motivation
Attitude Formation
Legitimation
Trial
Evaluation
Adoption
Rejection
Resolution etc.

This process primarily describes the effects of accumulated knowledge about a problem and an innovation which addresses that problem. For example, a person learns of a problem, becomes motivated to acquire information about possible solutions, subsequently develops attitudes toward the innovation which, if favorable, causes the person to seek further reinforcing or legitimating evidence which may precipitate a symbolic or actual trial. Information gained from this trial is evaluated and subsequently leads to a decision to adopt or reject the innovation. Further information is used to reaffirm or possibly question the adoption/rejection decision.

Knowledge is used at each of these stages. The knowledge or information used at each stage may often vary. Additionally, the same knowledge may be used differently at different stages. As a certain confidence level is reached with regard to, say, attitudes, a person moves into the legitimation stage. When a sufficient confidence level is reached at that stage the trial stage is entered and so forth. Only certain stages (e.g. trial, adoption) under certain conditions (when the innovation has a physical form) will have behavioral manifestations. Most stages and indeed many innovations do not have observable manifestations. Most knowledge that is "used" as a person goes through this process is used with regard to the less visible stages. It is used to: (1) recognize and understand a problem; (2) become motivated to acquire still more knowledge; (3) form attitudes; (4) legitimate the possible action; etc. In all instances increments in knowledge are associated with a series of different and perhaps sequential critical thresholds. It is important to point out that a person may not go through the entire process. A critical threshold may not be achieved at any one stage to warrant further consideration of the innovation. In a sense, a negative critical threshold is achieved. In fact, most innovations do not succeed in terms of widespread use or succeed only after a long time period. However, pertinent knowledge about the innovations is being used even though overt adoption of the innovation does not occur. In fact knowledge may be used in very different ways regardless of the outcome of a decision. It becomes a nearly impossible task to associate a unique knowledge item with the acceptance or rejection of an innovation since knowledge impacts frames of reference relating to several different social and psychological activities such as motivation, attitude formation, legitimation, resolution and so forth.

What If...?

One way of measuring use of knowledge is to estimate the effect of its absence. First let's consider a simple hypothetical illustration. Assume a particular pharmacological advance has resulted in an effective curative treatment for an illness for which no treatment previously existed. This knowledge advance may be physically manifested by a drug. The impact of that knowledge could be measured prospectively by observing the number of people: (1) having the illness, (2) taking the new drug, and (3) experiencing a cessation of the illness. One could also retrospectively assess with reasonable accuracy the impact of this knowledge. The question, "what if the knowledge leading to the new treatment did not exist?" could be readily answered at least in terms of its impact on users of the treatment. (The issue of use versus impact is discussed elswhere in this paper.) If the new drug were preventive in nature we would simply need the additional estimate of the number of people who would likely have experienced the illness in order to answer the "what if" question.

An alternative approach to educational R&D may also be necessary. For many specific R&D efforts, as well as for R&D in general it is difficult to link unique knowledge applications with unique products of knowledge. We may know that the linkage is there just as we know attitudes and behavior are often linked although establishing the connection empirically is difficult due to observable and unobservable intervening events. A way around this difficulty is to rely on probabilistic models. For example, if it can be demonstrated within a given subjectively determined confidence interval, that an average of twenty percent (20%) (or 5% or 40%) of all R&D efforts in several sectors (each of which has something in common with educational R&D) ultimately receive widespread application within, say, a fifteen year time period then we might be justified in applying this twenty percent to existing educational practices. Thus, we could reasonably suggest that twenty percent of all present practices in education or in specific areas such as testing, organization change, etc. would not exist or would be very different had there been no R&D during a past period of time. We probably could not say which practices would be affected but only that a certain percentage would be affected.

The "what if..." notion might be pursued more formally in different ways. One way which will be mentioned only briefly concerns the concept of minimax opportunity loss (regret) (Savage, 1951). An opportunity loss is the cost or regret we may experience by a failure to take the best available action. The "best available action" might relate to the level of R&D funding or areas of funding. The opportunity loss associated with the absence of educational R&D is the regret we experience with regard to educational practices which would have been improved had the foregone knowledge been available.

The opportunity loss could also be the regret we experience by not selecting the most effective test instrument or best diagnostic approach among the available alternatives. Where different tests may each have different maximum "losses" we would select that instrument which minimizes expected losses. Also, within a given area, say educational testing, decisions must be made concerning funding levels. Each funding level may be associated with a particular maximum loss. Importantly, the loss may not be linearly related to foregone funding support. An agency controlling research funds would fund at that level which yields the smallest maximum opportunity loss. Thus maximum opportunity losses are minimized.

We could also construe our "events" so that we assess the opportunity loss of not having an item of knowledge or not applying that item of knowledge. Thus for the existing array of educational practices which have an associated but not demonstrably connected knowledge base, we could do the following. Identify the opportunity loss associated with the absence of each practice were it in fact a result of the associated knowledge produced by educational R&D. Next we would take several random combinations of practices where each combination does not exceed 20% of the entire set of practices (or whatever percentage of the set we might estimate to be a result of educational R&D). This would generate an array of possible regrets associated with not having knowledge or in having it but not applying it when it might feasibly have been applied.

Displacement

When an item of knowledge is accepted and implemented it may be displaced by another item of knowledge. For example the knowledge that the involvement of certain types of teachers at all stages of an R&D process might yield higher quality innovations under particular conditions may displace earlier "knowledge" that teacher involvement may yield lower quality innovation. The knowledge that a new method of teaching or testing is superior to an older method may lead to the discontinuance of the older method in favor of the newer method. Thus, implicit in the notion of knowledge use is the notion of knowledge discarding or displacement. If an item of knowledge is intended to replace another item then we might expect increased use of "X" to accompany a decreased use of "Y".

While we might expect measures of the use of "X" and dis-use of "Y" to be correlated, the correlation may not necessarily be very high. A researcher may perceive a particular notion to be a rival hypothesis to another notion, test it as such and consequently rule out the other competing hypothesis. However, the user of the researcher's findings may not necessarily perceive the two hypotheses as being rival notions. The very notion of rival hypotheses may be questioned by practitioners who are apt to be more sensitive to the differential conditions in which different ideas may work best or which may make "competing" hypotheses "compatible" hypotheses. Or, it may take time for the use of "Y" to lessen even while "X" is being used as teachers experiment in their own fashion with both "X" and "Y". Or, one may find a blend of "X" and "Y" being used. This in turn suggests a new concept or knowledge item ("W") whose use can't be measured by looking at "X" alone or "Y" alone or even at "X" and "Y" together. It is also possible that the "X" could impact "Y" prior to its acceptance. That is, if "X" questions "Y" although itself is not used in lieu of "Y" there may be changes in the degree and way in which "Y" is used. This may be more evident by looking at changes in consequences of using "Y". These may show up earlier than any consequences of the use of "X" or even the evidence of the awareness of "X".

An interesting variant of displacement concerns so-called negative findings. An item of knowledge may simply be that "Y" is incorrect or inappropriate for particular purposes. We shall label this $\overline{Y}$. However, an alternative or substitute for "Y" is not available. The finding $\overline{Y}$ may be accepted and provide enlightenment but the obvious instrumental use of $\overline{Y}$, which would be stopping the use of "Y" does not occur or at least not to the extent which might be expected. An administrator or teacher may in fact stop using "Y" and replace it with an alternative which they have developed. In this case $\overline{Y}$ leads to cessation in the use of "Y" which is replaced by $X_1, X_2, \ldots X_n$ which represent the different ideas developed by users in the course of their everyday experiences. If $\overline{Y}$ leads to formal development of substitutes or the articulation and consequent use of private theories-in-use (e.g. X_1, X_2, etc.) then $\overline{Y}$ could be said to have had an instrumental impact in terms of cessation of "Y" and the development and use of many alternative ideas.

Curative, Preventive and Combination Uses

Reference was made earlier to the curative and preventive uses of knowledge. A curative use of knowledge would be one which addresses in a corrective or remedial way a particular recognized problem. A preventive use of knowledge would be one which results in a problem not occurring which might otherwise occur or prevents an existing problem from becoming more serious. A combination use of knowledge is one which has both curative and preventive effects. For example, the research finding concerning IR&DT could have curative effects for an R&D manager who uses that knowledge by reconstituting an R&D team through the replacement of teachers without similar past experiences by teachers who have had similar past experiences. This would presumably alleviate a problem in effectiveness in educational R&D. This same R&D manager could use this knowledge in a preventive fashion when designing a new R&D team for a different and new innovation development activity. To the extent that the reconstituted R&D team assumes new activities in addition to existing activities or as prior tasks are completed then the application of the knowledge item about IR&DT would have preventive effects as well. It would thus be classified as having combination effects.

Much research in education and mental health service delivery has combination effects. As a validated program innovation is adopted by existing community mental health centers certain existing problems may be alleviated. As that same innovation is incorporated in a newly established center it may have preventive effects. Some forms of knowledge may be used in primarily curative or primarily preventive ways. For example, "knowledge" generated by White House Conferences may be primarily curative in impact in that their agendas often reflect concerns with current problems and existing programs and alternatives for addressing those problems (Vinyard, 1979). Many sophisticated management information systems and aspects of the social indicator field are concerned with predicting problems so that knowledge having preventive effects may be generated or located and then applied. In fact the knowledge used in the design of such systems is used for preventive purposes quite apart from the knowledge which is applied to prevent the predicted problem from arising or worsening.

Research on victimization poses an interesting example. Significant components of this research are of highly questionable validity despite its usage for curative purposes. The use (or misuse) of this research may not alleviate but actually aggravate the problems of victims. Efforts to lessen the use of existing victimization research--based on the knowledge that such research is of very questionable validity--are preventive in nature. That is, the problem is prevented from becoming more serious by preventing the application of inappropriate information. The application of knowledge which questions the validity of previous information intended to have curative effects but which is found to be damaging constitutes a preventive use of knowledge.

Measures of Use

The conceptualization of "use" discussed thus far necessarily involved measurement issues. Certain measurement issues will be looked at more explicitly now. However, these also imply certain additional conceptualizations which have not been touched upon.

Monetary Expenditures

One measure of use is monies expended on the acquisition of knowledge when there is a clear manisfestation of knowledge in the form of a service or product. Examples would include expenditures for expert advice and for books reflecting a particular philosophy concerning educational practice. This is a good summary measure for measuring adoption over different time periods when the cost of the technology is constant or where changes in cost over time may be adjusted accurately. A major limitation of this measure is that it does not provide insight into the proportion of potential users of the knowledge who are being reached. Nor does this measure permit comparison of different knowledge items or permit standardization for organizations or sectors having different cost structures. Technological and profit impact on the user cannot be readily assessed either.

Unit Adoptions

The number of "units" of an item of knowledge (e.g., a new text, laboratory equipment, etc.) adopted by individuals or groups is another measure of use. Depending on the knowledge in question, this may be measured by a number of different organizations or persons using the process, technique or equipment, the number (or proportion) of instances (e.g., plants/divisions/operations, etc.) in which a given agency is using the knowledge, the proportion of a given sector using the knowledge, the number of different contexts which have adopted the knowledge (e.g., higher education, medical industry, chemical manufacturing industries, etc.). This measure of use has the advantage of reflecting the pervasiveness of use within a given firm, industry, or other defined context of use. However, alone it does not necessarily reflect continued use of "enabling" effects which will be described next.

Gateway Capacity

Some knowledge has an enabling function or effect. That is, use of the knowledge is significant primarily in that it permits either the use of other knowledge which is critical to an activity or it stimulates other activities which collectively have a major impact on users. If the dollar cost of the enabling knowledge is small or the number of potential users is small the true impact of the knowledge is likely to be severely underestimated if these measures alone were employed. Often the enabling function differs in different settings and hence requires close monitoring of the different settings in order to observe them. This is all the more important when the improvements they permit are not anticipated. This ability of one knowledge innovation to open the way for other improvements is its gateway capacity. The effect the use of an item of knowledge has on the immediate problem it is intended to help solve may be much less than the effects its use has in paving the way for the adoption of other solutions to more pressing problems. Dollar and unit adoptions generally do not capture this important dimension of "use."

Adaptation

Many knowledge innovations are modified or adapted, sometimes substantially, by users. For example, in a survey of forty-nine social workers we focused on the use of information sought with regard to a critical problem of current concern to the social worker. Of the thirty-eight respondents who had found relevant information, twenty-eight persons or seventy-four percent indicated that they had to "change" the information to make it more relevant. There are further indications that substantial changes were made to make it relevant. Approximately forty-five percent of the respondents indicated that further changes were necessary during the implementation of the information. Thus, in this sample, there was considerable adaptation taking place with regard to the original information. One could argue that the information became knowledge only after the alterations were made. This would be a plausible argument from the user's standpoint. However, undoubtedly the producer of the original information perceived it as knowledge and from that perspective at least a knowledge adaptation occurred.

Regardless of whether the adaptations occur prior to or subsequent to the initial implementation of the original knowledge innovation, the original knowledge innovation serves as an enabling device. It is used as the basis for a different solution to the same problem or a new solution to a different problem. If knowledge use is measured only by reference to items which are unaltered by users then there will be an underestimation of the impact of a given item of knowledge. Widening the measure of use to encompass knowledge adaptations is especially appropriate when circumstances of particular poetntial users vary greatly implying a high likelihood of adaptation. Thus it is important to measure the extent to which the idea inherent in a knowledge item is used rather than simply the use of the knowledge exactly as it was produced.

Use vs. Impact

A distinction was made earlier between use and impact. In this distinction "use" refers to acceptance and/or implementation while "impact" refers to consequences of acceptance and/or implementation with respect to the purposes for which it was accepted (this distinguished impact as discussed in this paragraph from adaptability and gateway capacity). It is important to assess this type of impact. Impact may be treated as a component of use. Accordingly, the "value added" by a particular item of knowledge needs to be assessed. Value added itself has many possible dimensions. When knowledge is expressed in industrial technology the possible dimensions include: (1) the financial savings the new technologies permit in a production process; (2) lower market prices; (3) differentiation of products which permit more effective market segmentation; (4) entry into new markets with existing or new products; (5) enhanced employee safety; (6) favorable environmental impact; and so forth. These and other impacts are not accurately or easily tapped (if at all) by other measures of use.

Penetration

Another element of impact concerns the fidelity of the adoption. The simple acquisition of knowledge for overt application does not automatically imply actual use. Other factors, unanticipated at the time a formal commitment was made to acquire the knowledge may cause a delay in its application.

Additionally, initial implementation followed by long term continued use or even expanded use should be distinguished from instances where the knowledge is discontinued soon after initial implementation. An item of knowledge having a relatively low cost but which is used for a significant period of time could be said to have a greater impact than a more expensive item of technology which was discontinued soon after initial use. Reliance solely on unit adoption or monetary indicators would tend to underestimate the degree of use in the former case and overestimate it in the latter case.

Conclusion

This paper has discussed selected construals of the term "use" and commented briefly on certain measurement issues. It seems quite evident that a given item of information which might be considered as valid by a designated potential user may be employed in very different ways. These applications may vary across different users or may be applied in multiple ways by a given user. Frequently, knowledge use is unobservable. All concepts and issues addressed in this paper require extensive further elaboration and challenge. However, there are certain related matters not addressed in this paper which are equally in need of examination. For example, the content of knowledge clearly has an interaction effect with use. Whether this knowledge is positive or negative appears to be important (Locatis, et al, 1980). Construals of misuse and abuse have not been addressed. It is difficult to see how construals of use can be understood without better understanding misuse (cf. Cook et al, 1980). The social context in which knowledge might be used impacts the character of use, as well as the extent of use. This list could be extended very substantially. Better understanding of the diverse conceptualization of the term "use" should be a high research priority. Without a better understanding the field of knowledge use may reach an intellectual plateau disappointingly early.

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IX REFORMS AS ARGUMENTS

William N. Dunn

Introduction
The Experimenting Society
Jurisprudence as Metaphor
A Transactional Model of Argument
Testing Knowledge Claims
Threats to Usable Knowledge
Conclusion

ABSTRACT

This paper contends that argument is a more appropriate analogy for reforms than is experiment. In an experimenting society, the outcomes cannot be said to be independent of the preferences of stakeholders in social reforms. The change in analogy directs attention to the knowledge transactions in which knowledge claims are assessed in accordance with frames of reference constituted by different configurations of adequacy, cogency, and relevance tests.

REFORMS AS ARGUMENTS

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INTRODUCTION

The social sciences are an outgrowth of efforts to understand and alleviate practical problems through social reform. The development of social science disciplines is therefore practice-driven and not, as is mistakenly assumed by those who squat in the shade of the natural sciences, a product of "basic" research. This myth of the basic-to-applied research cycle, together with derivative misconceptions about the role of "social engineering," was challenged by Lazarsfeld throughout his career (Holzner, Marx, and Fisher, 1977). In his last published book he urged once more that we acknowledge the ordinary contexts of practical action which continue to drive the social sciences:

> The argument goes that applied research is radically different from basic scientific work and therefore detracts talent and resources from true progress in the discipline. This implies a false comparison with the natural sciences. It is true that technical engineers could not succeed without the knowledge provided by abstract research in mathematics and laboratory experiments of the "pure" sciences. But it

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> is misleading to draw an analogy between the natural and social sciences. Nowhere in the social realm are there unconditional laws and basic theories already well established. Quite to the contrary, it is the study of concrete and circumscribed practical problem-areas that has contributed a good part of the present-day general sociological knowledge. Adopting a famous dictum by Lewin, one could say that nothing is more conducive to innovation in social theory than collaboration on a complex practical problem.
> (Lazarsfeld and Reitz, 1975:10).

While the social sciences are thus an outgrowth of attempts to understand and alleviate practical problems they nevertheless represent more than "the growth of ordinary knowledge writ large" (Popper, 1963:216). The social sciences have built upon but also transformed ordinary knowledge, frequently in ways that produce unhappy results. For every Authoritarian Personality or American Soldier there is at least one Project Camelot, while countless apparently innocuous or incompetent applied research efforts have legitimized bureaucratic interests in the name of "science." Indeed, the bulk of social science research appears to make little if any contribution to improvements in social theory or social practice.

We are therefore confronted by a paradox: Those very sciences that owe their origins to practice rarely produce knowledge which enlarges our capacity to improve that practice. For many this paradox is resolved by elevating social scientists at the expense of practitioners, typically by urging that canons of scientific reasoning displace the routines of politics (Bernstein and Freeman, 1975). For others the paradox dissolves under the weight of arguments that the social sciences simply yield less usable knowledge than do various forms of interactive problem solving based on common sense, casual empiricism, or thoughtful speculation and analysis (Lindblom and Cohen, 1979). Here we are urged to displace the social sciences with ordinary knowledge that "is highly fallible, but we shall call it knowledge even if it is false. As in the case of scientific knowledge, whether it is true or false, knowledge is knowledge to anyone who takes it as a basis for some commitment to action" (Lindblom and Cohen, 1979:12).

This radical juxtaposition of science and ordinary knowledge, while punctuating controversies surrounding the definition of usable knowledge, obscures important questions: According to what standards do policymakers, social scientists, and other stakeholders in social reform assess the "truth" and "utility" of knowledge (Weiss and Bucuvalas, 1980a)? Are such standards properly confined to "threats to validity" or "plausible rival hypotheses" invoked to assess social experiments (Cook and Campbell, 1979)? Can social science theory and research themselves be used to investigate the social origins and practical uses of knowledge that has been certified on the basis of competing standards (Holzner and Marx, 1979)? Can we raise these competing standards to an explicit level of consciousness where they may shape a genuinely critical public discourse (Habermas, 1975)? Finally, are reforms best viewed as reasoned arguments or debates, that is, "critical social transactions" aiming at improvements in knowledge and its social uses (Toulmin, Rieke, and Janik, 1979)?

In responding to these questions this paper offers six related claims. First, the metaphor of the "experimenting society" (Campbell, 1969 in 1975b; 1971), since it is still burdened with residues of a positivist philosophy of science, places unnecessarily severe constraints on the range of standards available to assess and certify claims about social reform. Second, and in contrast, reforms are best viewed as arguments, a metaphor whose roots lie in the everyday social interaction of policymakers, scientists, and citizens-at-large. When we revisualize reforms as arguments it is no longer possible to make facile distinctions between "science" and "ordinary knowledge;" nor are we likely to reach the patently false conclusion that knowledge derived from one or the other source is inherently superior. Third, a transactional model of argument adapted from Toulmin (1958) provides a conceptual framework which not only accomodates the experimental metaphor--including "threats to validity" and their philosophic justification--but also permits a radical enlargement of standards for assessing and challenging knowledge claims. The transactional model is therefore appropriate as a central organizing construct for a new social science of knowledge applications, since it clarifies and specifies the notion of "frames of reference" by providing several classes of "tests" for assessing the adequacy, relevance, and cogency of knowledge claims. Fourth, and relatedly, these classes of tests may be transformed into threats to usable knowledge, that is, plausible rival hypotheses about the conditions under which knowledge claims will be accepted as a precondition of action. Finally, the transactional model supplies the contours of a critical social science of knowledge applications, that is, a social science which uncovers and raises to a level of explicit consciousness those unexamined prior assumptions and implicit standards of assessment that shape and also distort the production and use of knowledge. By making such standards transparent and public a critical social science of knowledge applications may contribute to an expansion of individual and collective learning capacities and, thus, to emancipatory social reforms.

THE EXPERIMENTING SOCIETY

Among the many perspectives available for exploring the nature of social reforms Campbell's "experimenting society" (Campbell, 1971) has attracted great attention among applied social scientists in the United States (see Salasin, 1973). Drawing on analogies to physics, biology, psychology and other laboratory sciences, this perspective is founded on an evolutionary epistemology which claims that the growth of individual and societal knowledge is a consequence of trial-and-error learning processes involving successive attempts to compare hypotheses with experimentally induced outcomes (Campbell, 1959; 1974). This evolutionary view, partly based on Popper's natural-selection epistemology (Popper, 1959, 1963), claims that the aim of experiments is to achieve objective knowledge by challenging conventional scientific wisdom and current opinion. While experimentation is "the only available route to cumulative progress" in education and other domains of social reform it is not a panacea for social and scientific ills; nor is it an inherently superior substitute for well-tested ordinary knowledge that has evolved over many centuries of trial-and-error learning by practitioners (Campbell and Stanley, 1963:3-4). Indeed, the growth of ordinary and scientific knowledge is a cumulative product of evolutionary changes in human cognitive capacities for causal reasoning (Campbell, 1974; Cook and Campbell, 1979). Causation, therefore, is an inherited property of human cognitive evolution and not a special prize reserved for university people.

The experimenting society, while conditioned by ineluctable changes in human cognitive capacities, is nevertheless an active and critical society (Campbell, 1971). The experimenting society requires a critical posture towards all knowledge, since there are neither essential nor necessary and sufficient causes in nature. This critical posture is embodied in the principle of falsification, where "not yet disproven" points to the impossibility of ruling out all relevant alternative hypotheses (Cook and Campbell, 1979). While all data are theory-dependent, thus punctuating subjective properties of all human inquiry, the experimenting society avoids epistemological relativism by positing an external reality or "nature" against which hypotheses may be tested, notwithstanding the impossibility of fully testing causal claims against that nature. Moreover, theories of causation are understood in the sense of "nuisance factors" actually present in contexts of practice, while the most valid causal influences are those involving factors that may be actively manipulated by experimenters. Grounded in ordinary language and everyday interaction, this practical and active theory of causation does not presume full and complete causal explanations, as does basic research in scientific disciplines. Partial explanations suffice. Thus, for example, manipulable causes (e.g., a light switch) may be activated to produce a desired effect (illumination) without understanding theories of electronics or particle physics.

The metaphor of the experimenting society is therefore an extension of an evolutionary critical-realist epistemology and not, as some critics would have it, a naive emulation of a natural science paradigm based on hypothetico-deductive methodology (Patton, 1975; 1978). A critical epistemological posture is evident in the distinction between "trapped" and "experimental" administrators, the latter of whom are urged to advocate reforms "on the basis of the seriousness of the problem rather than the certainty of any one answer and combine this with an emphasis on the need to go on to other attempts at solution should the first one fail" (Campbell, 1969 in 1975b:35). While acknowledging the vicarious, distal, and socially embodied character of knowledge (Campbell, 1959; 1979), the experimental metaphor is based on an ontologically realist posture that places primary reliance on experimentally induced outcomes that are independent of the desires of reform-minded social scientists and administrators.

The appropriateness of the experimental metaphor depends in part on our success in establishing that social systems in which reforms are carried out are analogous to physical systems in which laboratory experiments are conducted. While a major aim of writings on quasi-experimentation has been to show that laboratory experiments are not feasible in field settings--that "pure" experiments have been oversold and misrepresented--it is also true that the experimental metaphor retains an objectivist ontological platform appropriate to the study of physical systems. For example, describing a nested hierarchy of evolutionary learning processes of which science is the most developed Campbell observes:

> What is characteristic of science is that the selective system which weeds out among the variety of conjectures involves deliberate contact with the environment through experiment and quantified prediction, designed so that outcomes quite independent of the preferences of the investigator are possible. It is preeminently this feature that gives science its greater objectivity and its claim to a cumulative increase in the accuracy with which it describes the world. (Campbell, 1974:434).

The characteristic feature of social systems, as distinguished from physical ones, is that they are created, maintained, and changed through symbolically mediated interaction (Holzner, 1969). Whereas physical systems may be presumptively characterized in terms of a stable external reality that edits experimental trials independently of the preferences of investigators (Campbell, 1974: 435), social systems may be characterized (again presumptively) in terms of a dynamic external reality that edits and interprets experimental trials

on the basis of outcomes that are independent of the preferences of some investigators but quite dependent on the preferences of others. Social systems, therefore, cannot be satisfactorily characterized as either objective or subjective entities, or even as both. Social systems, as dialectical entities, are more than both: "Society is a human product. Society is an objective reality. Man is a social product" (Berger and Luckmann, 1967:61).

This dialectical claim does not simply affirm that social systems are cultural entities whose symbolic and self-reflective properties set them apart from physical ones; nor does it deny that social systems are perceived as objective entities by their members. Rather it affirms that knowledge of social systems must, of necessity, be based on an understanding of the diverse meanings attributed to reforms by stakeholders who participate in the creation, maintenance, and transformation of humanly objectivated social structures. Social reforms are therefore symbolically mediated change processes the understanding of which requires that we uncover the action-motivating reasons which guide efforts to alleviate practical problems.

Therefore, the case for social experimentation as the only "truly scientific" approach to reform (Campbell, 1975b:72) stands or falls on the persuasiveness of the claim that experimental data are not symbolically mediated--that is, that experimental outcomes constitute the sole source of knowledge that is not determined by the purposes of the experimenter. To make this claim Campbell asks us to imagine experiments as tribal rituals which are

> meticulously designed to put questions to "Nature Itself" in such a way that neither questioners nor their colleagues nor their superiors can affect the answer. The supplicants set up the altar, pray reverently for the outcome they want, but do not control the outcome (Campbell, 1979b:198).

This tribal analogy, instructive because of its simplicity, raises several difficulties. First, it is unlikely that all tribal cohorts will accept the rule of empirical correspondence as an impartial standard for resolving problems that originally created a need for experimentation. In fact, it is not the reasoned acceptance of this or any other scientific norm that alone lends authority to experimental data. Also relevant are the diverse social sanctions, including disgrace and expulsion, that accompany the process of competitive experimental replication in scientific communities. "This competitive scrutiny is indeed the main source of objectivity in sciences (Polanyi, 1966, 1967; Popper, 1963) and epitomizes an ideal of democratic practice in both judicial and legislative procedures" (Campbell, 1975b:80).

The social organization of inquiry implied by this ideal-typical community of experimenters, even if it reflected the practice of physicists (cp. Kuhn, 1971), fails to capture the behavior of policymakers, practitioners, social scientists, and other stakeholders in social reform. The key participants in social reforms share neither the standards of appraisal nor the incentive structure of this ideal-typical community. For this reason experimental outcomes are unavoidably mediated by diverse standards of appraisal which are unevenly distributed among stakeholders in reform.

Thus, claims about the appropriateness of the experimental metaphor are persuasive only if the nature of experimental results automatically foreclose options for symbolically mediated interpretation. While we might grant that experimental results "certainly are not speaking for one's hopes and wishes" (Campbell, 1979:198), neither do they speak for themselves. Thus, for example, experimenters might share norms of competitive replication and experience disappointment with outcomes that run counter to their preferences, but nevertheless resist any inference that experimental results actually disconfirm a favored theory of reform. A principal reason for this resistance is that even well-socialized experimenters cannot be expected to share the same theoretical framework which elicited the choice of the particular (falsified) reform as a promising experimental intervention. Social theories, unlike physical ones, are difficult to falsify with experimental data because the interpretation of such data is mediated by the assumptions, frames of reference, and ideologies of social scientists and other stakeholders in reform.

The presence of symbolically mediated experimental outcomes is precisely what is at issue in social reforms whose aim is to alleviate problems that have been described as ill-structured (Mitroff, 1974), squishy (Strauch, 1976), or messy (Ackoff, 1974). Ill-structured problems are those where the main difficulty lies in defining the nature of the problem, rather than determining through selective experimental interventions the most effective reform to alleviate it. Here the primary sources of invalidity are not those _first-order_ threats to internal, external, and statistical conclusion validity detailed by Campbell and colleagues (Campbell and Stanley, 1963; Cook and Campbell, 1979), but _second-order_ threats that call into question the appropriateness of problem definitions that create the need for experimental interventions and their assessment in terms of standard (first-order) threats to validity.

Second-order threats transcend or go beyond first-order threats (history, maturation, regression, instability, etc.) by providing metacriteria against which the formulation of a problem--as distinguished from constituent causal inferences that represent a solution within the boundaries of that problem--may be assessed and challenged. Second-order threats are sometimes defined as Type III errors by juxtaposing the formulation of the wrong problem (E_{III}) to setting statistical confidence limits too high (E_{I}) or too low (E_{II}) in testing the null hypothesis (Kimball, 1957; Raiffa, 1968; Mitroff and Sagasti, 1973). Since threats to validity have been explicitly invoked as a challenge to the error of misplaced statistical precision (Campbell and Stanley, 1963:7) it is desirable to devise new terms that do not hinge on the dichotomy of errorful calibration (E_{I} and E_{II}) errorful conceptualization (E_{III}). Accordingly, first-order errors (E^{1}) involve the choice of the less valid of two or more causal inferences, while second-order errors (E^{2}) involve the selection of the less appropriate of two or more worldviews, ideologies, frames of reference, or problem definitions when instead the more appropriate one should have been selected (Mitroff and Sagasti, 1973; Dunn, 1981:109-110).

Confronted by an ill-structured problem the reform-minded administrator or social scientist might use "multiple measures of independent imperfection" (Campbell and Fiske, 1959; Webb et al., 1966) to ensure that measures are responsive to the diverse aims of stakeholders. Further,

> the loyal opposition should be allowed to add still other indicators, with the political process and adversary argument challenging both validity and relative importance, with social science methodologists testifying for both parties, and with the basic records kept public and under bipartisan audit. (Campbell, 1975b:80).

These adversary procedures are relevant only where stakeholders cannot arrive at a common definition of reform. Yet to justify a reform "on the basis of the seriousness of the problem rather than the certainty of any one answer" (Campbell, 1975a:35) begs the question: On the basis of what standards are we to assess the appropriateness of the problem? First-order threats do not assist in answering this question, since they are relevant and applicable only within a given problem frame. Required are second-order threats for critically challenging the appropriateness of the problem frame itself. To confuse these two levels is to violate a basic logical axiom: "whatever involves all of a collection must not be one of the collection" (Whitehead and Russell, 1910:101, cited in Watzlawick et al., 1974:6).

Thus, while threats to validity provide a critical mechanism for reducing the probability of first-order causal errors (E^1), they do not deal satisfactorily with second-order conceptual errors (E^2). The experimental metaphor acknowledges the priority of pattern identification over knowledge of details, but only at the level of first-order causal errors:

"Qualitative, common-sense knowing of wholes and patterns provides the enveloping context necessary for the interpretation of particulate quantitative data." Thus, the experimental metaphor calls for the integration of qualitative and quantitative standards for assessing and challenging knowledge claims. Yet this general plea simply exhorts social scientists to recognize the dependence of quantitative on qualitative knowing, for example, to recognize that several threats to validity (e.g., history) are based on common-sense knowing (Ibid.:15). Even here the loose translation of qualitative knowing into specific threats to validity excludes or ignores many varieties of qualitative knowing, including several forms of ethical and practical reasoning that are highly appropriate for understanding purposive social behavior (see von Wright, 1971). In short, qualitative knowing is not explicitly, formally, and systematically incorporated into the critical methodological repertoire of social experimentation.

JURISPRUDENCE AS METAPHOR

Any metaphor of reform should be assessed according to its capacity "to produce satisfactory explanations of the type of events which it investigates, rather than its success or lack of success in getting results by the methods of natural science" (Levinson, 1966:144; Dunn and Fozouni, 1976). Because reforms are symbolically mediated and purposive social processes aiming at changes in the structure and functioning of some social system, they necessarily involve outcomes which are valuative as well as factual in nature. The success of reforms therefore depends on rationally motivated consensus that some projected future social state is both possible and desirable. In turn, any applied social science which seeks to critically assess and improve the process of reform must address competing ethical as well as explanatory hypotheses (see MacRae, 1976). For this reason reforms are appropriately viewed as a process of reasoned argument and debate where competing standards for assessing the adequacy of knowledge claims include, but are not limited to, rules for making valid causal inferences. Here the appropriate metaphors are drawn from jurisprudence (Toulmin, 1958), law (Levine and Rosenberg, 1979), forensics (Brock et al., 1973; Bronw, 1976), and rhetoric (House, 1980), disciplines in which causal inferences play an important but non-exhaustive role.

The appropriateness of the jurisprudential metaphor becomes evident once we consider standards for appraising knowledge actually applied in the course of social reforms. In the field of evaluation research Suchman (1972) alerts us to the pervasiveness of experimental outcomes which are mediated by the worldviews, ideologies, and frames of reference of stakeholders in reform. Collectively described as "pseudoevaluation," these forms of symbolic mediation include the selective use of data to make a reform appear worthwhile ("eyewash"), the suppression of data which runs counter to the preferences of reformers ("whitewash"), the use of data to subvert a reform ("submarine"), the ritualistic collection of data on a reform for purposes unconnected with its consequences ("posture"), and the use of data to delay reform itself ("postponement"). Similarly, Rein and White (1976) call attention to several latent goals of government-sponsored policy research, including the containment, subversion, and policing of social reforms. Given the complexity of social problems scientifically popular recommendations for improving the production and use of applied social research--including more rigorous research designs, better sampling procedures, and administrative centralization--are likely to be marginally effective, superfluous, or mystifying (Rein and White, 1976:244-50).

These observations on the latent goals of applied social research suggest that we should begin with the practice of assessing knowledge claims made in the course of reforms, hoping to uncover concepts and standards of assessment which later might be used to develop theories of knowledge production and use. This aim can be facilitated by viewing reforms as reasoned arguments, rather than experiments which put questions to "nature itself." Arguments are like lawsuits, while conclusions are similar to claims put forth in court. Conflicts among stakeholders are analogous to cases in law where disputes are settled by invoking standards appropriate to different contexts, for example, criminal or civil disputes. Whereas the aim of jurisprudence is to study the variety of concepts and procedures used to resolve legal claims, the aim of the applied social sciences is to investigate concepts and procedures used to argue and settle practical claims. The applied social sciences may therefore be described as "generalized jurisprudence" or, alternatively, as "jurisprudence writ large" (compare Toulmin, 1958:7).

The jurisprudential metaphor is particularly appropriate for investigating reforms, since the data or evidence introduced in a given case are only one of several elements necessary to make a successful claim. Equally important are the standards of appraisal employed to interpret data. Despite the belief that the applied social sciences produce conclusive fact and proof

> they are instead engaged in producing inconclusive evidence and argument. Problem complexity denies the possibility of proof and reduces the pursuit of fact to the pursuit of those selective facts which, if appropriately developed, constitute evidence in support of relevant argument.
> (Lindblom and Cohen, 1979:81).

Argumentation is, therefore, a social process where all data or evidence are symbolically mediated. Whereas proof, demonstration, or validation hold that truth is directly and immediately attainable, argumentation sees truth entirely as a social construction (Phillips, 1973), as a product of natural social comparison processes:

> Put analogically, arguments are naturally occurring corollaries to research contexts... It is rather as if we were to stand back and watch while our subjects framed their own hypotheses, selected methodological principles most appropriate to the hypotheses, utilized techniques appropriate to both, and conducted their own research act... arguments give us more information than other kinds of research.
> (Willard, 1980:9-10).

The jurisprudential metaphor is closely tied to classical and modern philosophical traditions where reason serves a practical and critical function in assessing knowledge claims. The jurisprudential metaphor

> helps to keep in the centre of the picture the critical function of the reason. The rules of logic may not be tips or generalizations; they none the less apply to men and their arguments—not in the way that laws of psychology or maxims of method apply, but rather as standards of achievement...
> A sound argument, a well-grounded or firmly-backed claim, is one which will stand up to criticism, one for which a case can be presented coming up to the standard required if it is to deserve a favourable verdict"
> (Toulmin, 1958:8).

The jurisprudential metaphor thus emphasizes that argumentation is a process of rational advocacy where stakeholders engage in the competitive reconstruction of knowledge claims. This competitive reconstruction, in contrast to the competitive replication of experiments, leads towards a pragmatic and dialectical conception of truth where social discourse plays a reflective and critical role in producing new knowledge. Knowledge is no longer based on deductive certainty or empirical correspondence, but on the relative adequacy of knowledge claims which are embedded in ongoing social processes.

A TRANSACTIONAL MODEL OF ARGUMENT

Toulmin has operationalized the jurisprudential metaphor in the form of a structural model of argument (Toulmin, 1958; Toulmin, Rieke, and Janik, 1979). Extensions of this model to issues of public policy have recognized that the growing complexity of social problems demands increased reliance on persuasion, rather than formal logical certainty, and have called for systematic learning from practitioners as a major component of creative theory building in the applied social sciences (e.g., Brock _et al_., 1973; House, 1977, 1980; Kelly, 1980). In developing a reflective methodology for solving ill-structured problems Mason and Mitroff (1981) have linked the structural model to a dialectical conception of knowledge and have attempted to develop appropriate technologies that may be employed by policymakers in concrete settings.

In his critique of positivistic ethical theories Habermas (1975:107) employs Toulmin's distinction between analytic and substantial arguments to argue that the growth of knowledge takes place through the rationally motivating force of substantial arguments, that is, arguments which abandon criteria of conclusiveness, demonstrativeness, necessity, certainty, justification, or validity and which rely, instead, on rational standards of achievement which enhance the persuasiveness of claims in particular social contexts (Toulmin, 1958:234). Substantial arguments

> are based on logical inferences, but they are not exhausted in deductive systems of statements. Substantial arguments serve to redeem or to criticize validity claims, whether the claims to truth implicit in assertions or the claims to correctness connected with norms (of action or evaluation) or implied in recommendations and warnings. They have the force to convince the participants in a discourse of a validity claim, that is, _to provide rational grounds for_ the recognition of validity claims.
> (Habermas, 1975:107. Emphasis original).

Toulmin's model of argument, since it accentuates the critical and socially transacted properties of knowledge production and use, is most appropriately described as a transactional model of argument. The transactional model is important for the applied social sciences because, first, it provides a visual representation or structural schema which may be used to systematically map arguments offered by applied social scientists, policymakers, and other stakeholders in social reform. Second, the transactional model permits and even compels a reflective and critical examination of assumptions which constitute the worldview, ideology, or frame of reference of stakeholders who advance and contest knowledge claims. Third, the transactional model may be extended and elaborated to yield a typology of standards, rules, or tests for assessing and challenging the "truth" and "utility" of knowledge (see Weiss and Bucuvalas, 1980a; Holzner and Marx, 1979). This same typology also yields a classification of threats to usable knowledge, that is, rival hypotheses about the adequacy, appropriateness, and cogency of knowledge claims. Finally, the transactional model affirms that processes of knowledge production and use are symbolic or communicative actions involving two or more parties who reciprocally affect the acceptance and rejection of knowledge claims through argument and persuasion. Thus, knowledge is not "exchanged," "translated," or "transferred," but transacted by negotiating the truth, relevance, and cogency of knowledge claims.

The transactional model contains six elements: data (D), claim (C), warrant (W), backing (B), rebuttal (R), and qualifier (Q). Together these elements provide a visual representation or structural schema that may be used to map arguments. The first triad of elements parallel those of the classical syllogism: minor premise (D), major premise (W), and conclusion (C). The model is nevertheless designed as a challenge to the classical syllogism and other analytic arguments. For this reason Toulmin introduces a second triad of elements:

backing (B), rebuttal (R), and qualifier (Q). The backing (B), which consists of additional data, claims, or entire arguments, certifies the assumption expressed in the warrant and is introduced only when the status of the warrant is in doubt. In analytic arguments the backings of warrants are tautological, since they include information conveyed in the claim itself. By contrast, the backings of warrants in substantial arguments do not contain information conveyed in the claim (Toulmin, 1958:125). Practical arguments offered in the course of a social reform are seldom if ever analytic:

> If the purpose of an argument is to establish conclusions about which we are not entirely confident by relating them back to other information about which we have greater assurance, it begins to be a little doubtful whether any genuine, practical argument could ever be properly analytical. (Toulmin, 1958:127. Emphasis original).

The two remaining elements of the structural schema are the rebuttal and qualifier. The rebuttal (R) performs both a retrospective and anticipatory role by specifying conditions under which the adequacy or relevance of a knowledge claim may be challenged. Finally, the qualifier (Q) expresses the degree of cogency or force attached to the claim and is typically expressed with such terms as "definitely," "very probably," or "at the one percent confidence interval (p=.01)."

The structural schema provides an explicit visual representation of these six elements and their role in making practical inferences, much in the same way that symbols used to depict different types of experimental, quasi-experimental and pre-experimental designs provide a visual image of the role of independent and dependent variables in making causal inferences (Campbell and Stanley, 1963). In contrast to experimental design notation the structural schema surfaces and raises to a level of explicit consciousness the assumptions and presuppositions which provide rational backing for substantial arguments.

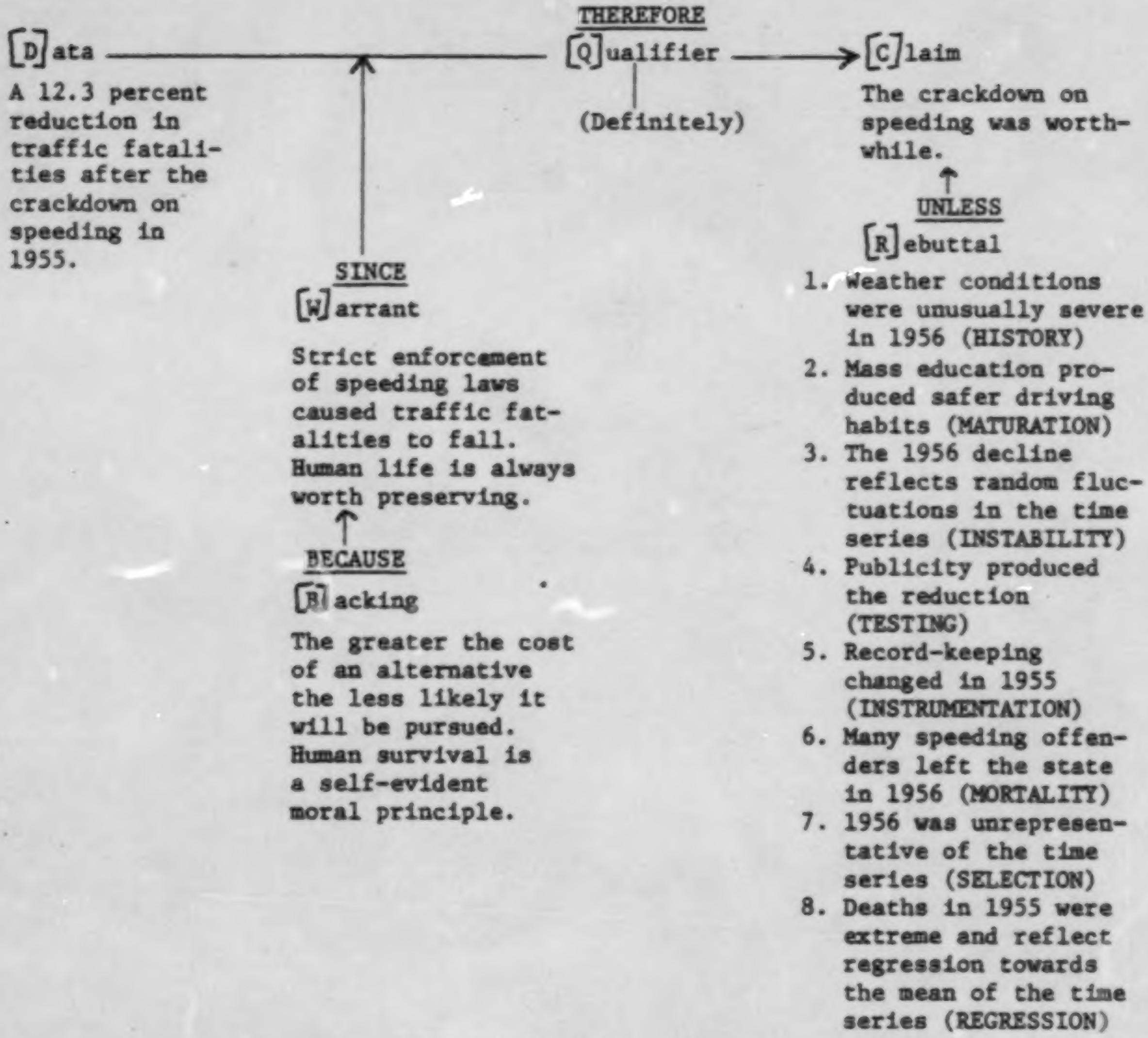
This critical function of the structural schema may be illustrated by borrowing from Campbell (1975b) a well-known example of quasi-experimental reform.

Following record high traffic fatalities in 1955 the Governor of Connecticut implemented a crackdown on speeding violators. After one year there were 284 traffic deaths, a 12.3 percent reduction from the record high of 324 in 1955. On the basis of these data (D) the Governor offered the following claim: "With the saving of 40 lives in 1956, a reduction of 12.3% from the 1955 motor vehicle death toll, we can say that the program is definitely worthwhile" (Campbell, 1975b:75-6). Figure 1 illustrates the Governor's argument, including suppressed warrants and backings and rebuttals based on threats to the validity of causal inferences (Campbell and Stanley, 1963; Campbell, 1975b).

(Place Figure 1 about here)

Figure 1

STRUCTURAL SCHEMA APPLIED TO THE
CONNECTICUT CRACKDOWN ON SPEEDING



THEREFORE

[D]ata

A 12.3 percent reduction in traffic fatalities after the crackdown on speeding in 1955.

[Q]ualifier

(Definitely)

[C]laim

The crackdown on speeding was worthwhile.

SINCE

[W]arrant

Strict enforcement of speeding laws caused traffic fatalities to fall. Human life is always worth preserving.

BECAUSE

[B]acking

The greater the cost of an alternative the less likely it will be pursued. Human survival is a self-evident moral principle.

UNLESS

[R]ebuttal

1. Weather conditions were unusually severe in 1956 (HISTORY)
2. Mass education produced safer driving habits (MATURATION)
3. The 1956 decline reflects random fluctuations in the time series (INSTABILITY)
4. Publicity produced the reduction (TESTING)
5. Record-keeping changed in 1955 (INSTRUMENTATION)
6. Many speeding offenders left the state in 1956 (MORTALITY)
7. 1956 was unrepresentative of the time series (SELECTION)
8. Deaths in 1955 were extreme and reflect regression towards the mean of the time series (REGRESSION)

SOURCES: Adapted from Campbell (1975b) and Dunn (1981).

The transactional model permits and even compels a reflective or critical posture towards the presuppositions of knowledge claims, whether practical or theoretical. For this reason it transcends overdrawn and facile distinctions between "professional social inquiry" and "ordinary knowledge" (Lindblom and Cohen, 1979), viewing both as potentially ideological in the classic sense of beliefs which originate in unexamined assumptions. The transactional model can also assist in transforming the empirico-analytic and hermeneutic sciences into critical ones (see Habermas, 1971), since the model forces the inspection of causal and ethical assumptions, as well as their underlying warrants, as part of a social process of interpreting qualitative and quantitative data.

Thus, the claim that "The crackdown on speeding was definitely worthwhile" might withstand all threats to validity but lack persuasive force. Thus, one or more stakeholders may question the adequacy of underlying causal assumptions ("strict enforcement of speeding laws caused traffic fatalities to fall") or moral principles ("Human life is always worth preserving"). If further support is required certain axioms of economic theory ("The greater the cost of an alternative the less likely it will be pursued") might be introduced as backing for the warrant, as might ostensibly self-evident moral principles (human survival). The claim here is not that these particular axioms and principles are necessarily adequate ones, since they are certain to be challenged by stakeholders who hold competing theories, worldviews, ideologies, and frames of reference. The point, rather, is that adaptations of the empirico-analytic sciences (e.g., Cook and Campbell, 1979) and extensions of hermeneutics (e.g., Patton, 1975; 1978) do not address such questions in a systematic, critical, and self-reflective manner.

The transactional model thus accomodates all potentially relevant types of claims and forms of argument. Attention is not confined to descriptive and explanatory claims, the standard and exclusive focus of the empirico-analytic and hermeneutic sciences, but extends to claims which have ethical content insofar as their aim is to evaluate or advocate action. Further, arguments are not limited to a particular causal form (for example, deductive-nomological explanation) but include other forms of causal reasoning such as those represented by quasi-naturalistic (historical), quasi-teleological (cybernetic), and teleological (practical) explanations (see von Wright, 1971). This capacity to distinguish diverse forms of argument and types of claims clarifies a number of methodological inadequacies found in the applied social sciences, including the pervasive misconception that "evaluation research" evaluates and the regrettable tendency among public policy analysts to view claims which advocate or recommend courses of action as emotive or ideological appeals that are devoid of rational content. As Tribe (1972), Rein (1976), and MacRae (1976) recognize, this tendency reflects the implicit positivistic assumptions of policy analysis as an applied social science discipline that ignores or denigrates ethical discourse.

A related advantage of the model is its capacity to surface and make explicit the processes of reasoning used to make knowledge claims. Whereas applied social scientists and practitioners frequently suppress steps in the process of reasoning from data to claim--for example, by claiming that coefficients of association or so-called "predictive" equations speak for themselves as a demonstration of causal patterns or sequences--the transactional model surfaces implicit causal and ethical hypotheses alike. This critical function is by no means limited to hypothesis-testing, since the model may be used to surface paradigms, worldviews, and frames of reference which unite epistemic communities (Holzner and Marx, 1979), establish the boundaries of disciplinary matrices (Webber, 1980), and distort the definition of social problems (Gregg et al., 1979).

By distinguishing analytic and substantial arguments the transactional model provides the applied social sciences with a framework and methodology for transcending pseudo-ethical disputes whose resolution appears superficially to lie in greater logical consistency or better empirical data. In analytic arguments the major premise or warrant is taken for granted, and the main task is to demonstrate that conclusions or claims follow from the data with deductive certainty. Yet it is substantial arguments, and not analytic ones, which characterize the bulk of knowledge claims put forth in the course of social reforms. For this reason disputes frequently turn on the presuppositions used to back warrants, and not on surface assumptions or data such as those found in authoritative moral principles or empirical observations which have been validated through intersubjective agreement.

It is, therefore, insufficient to treat ethical hypotheses solely in terms of standards appropriate for analytic arguments, for example, metacriteria of logical consistency, clarity, and generality (MacRae, 1976:90-98) or basic postulates of moral reasoning (Gewirth, 1979). Much less is it appropriate to confine ethical discourse to standards of appraisal appropriate for the empirical study of social determinants of knowledge or its applications (Holzner and Marx, 1979). The structural model, since it raises substantial arguments to a level of explicit consciousness, penetrates the rational content of ethical and non-ethical assumptions which individually and jointly motivate the acceptance and rejection of knowledge claims.

Finally, the transactional model provides concepts and procedures of argument-assessment which are reconstructable and public. The structural schema may be used retrospectively, to describe and evaluate different types of claims and arguments, but also prospectively. While it is not possible "to list in advance the ingredients of a convincing argument" (Phillips, 1973:178), the structural model can nevertheless be used prospectively to design arguments that withstand the diverse challenges or rebuttals which are commonplace in debates about reform. Mason and Mitroff (1981), for example, report the use of the transactional model to conduct an interactive dialectical debate among stakeholders engaged in resolving problems of public and business policy. Their interactive computer-assisted methodology not only permits stakeholders to attach ordinal plausibility values to each element of an argument and the argument as a whole but, more importantly, enables them to challenge and revise assumptions in the course of a reflective debate. A similar dialectical methodology, also based on the transactional model, has been used to select maximally usable performance measures in the domain of evaluation research (Dunn, Mitroff, and Deutsch, 1981). The aim of these procedures is not to "scientize" the model of argument, but to enhance prospects for its efficient use, recognizing that the capacity for reasoned debate and reflective understanding is a scarce resource.

TESTING KNOWLEDGE CLAIMS

Claims about social reform are products of frames of reference, that is, sets of systemically related assumptions that provide standards for appraising knowledge claims. A central component of frames of reference is what Holzner and Marx (1979:103-11) call reality or truth tests and which Weiss and Bucuvalas (1980a) have investigated in the form of truth tests and utility tests. Truth tests are

> decision points concerning evidence; the grounds for accepting or rejecting truth claims include...empirical as well as formal rational tests. Pragmatic tests rest on proof of workability...there are other tests of varying stringency and reliance on trust or authority.
> (Holzner and Fisher, 1979:233).

By contrast, utility or relevance tests are decision points concerning the delineation of an appropriate domain of inquiry or action. The basis for accepting or rejecting a relevance claim is the "potential significance of an item or line of inquiry...with regard to the inquirer's cognitive interests" (Holzner and Fisher, 1979:233).

Concepts of truth and relevance tests pose practically and theoretically important distinctions. Nevertheless, it is now unclear how such tests are actually distributed among stakeholders in social reforms and, indeed, whether the existence and functions of such tests may be investigated empirically. Available typologies of such tests contain ambiguities that now impede directed empirical research. Pointing to the elusive nature of "relevance" and "utility," Holzner and Fisher (1979:235) observe that "questions remain about the exact manner in which some information comes to the attention of a person and how it is sifted." Weiss and Bucuvalas (1980a), while calling for a new sociology of knowledge applications, call attention to the complexity of issues surrounding the concept of frame of reference and remind us of the many conceptual and methodological limitations facing those who wish to investigate the impact of truth tests and utility tests on individual and collective decisions.

The transactional model may be extended to generate a typology of knowledge claims and arguments which clarifies and specifies concepts of truth and relevance. Knowledge claims may be classified according to the explicit or implicit purposes of knowledge claimants or their challengers. Brockriede and Ehninger (1960), drawing from fields of forensics and semiotic, classify claims into four types: definitive, designative, evaluative, and advocative. The purpose of definitive claims is to provide knowledge about the appropriate definition of some object (What is it?), whereas that of designative claims is to supply knowledge about observed regularities (Does it exist?). In turn, the aim of evaluative claims is to provide knowledge about the value of an event or object (Of what worth is it?), while the purpose of advocative claims is to supply knowledge about policy (What should be done?).

Relevance tests are closely related to these four types of claims. If relevance tests are decision points concerning the delineation of an appropriate domain of inquiry or action, policymakers and practitioners appear to be predisposed towards tests of relevance that reflect an interest in knowledge about what courses of action to pursue to resolve problems (advocative claims). Discipline-based social scientists, by contrast, are generally oriented towards tests of relevance that reflect an interest in definitions (e.g., definitive claims about poverty, health, or achievement) and in observed regularities in society and nature (e.g., designative claims about the sources of social inequality). These divergent purposes underlie contrasts between policy research and discipline-based research (Coleman, 1972), distinctions between "macronegative" and "micropositive" research findings (Williams, 1971), divisions within the "two-communities theory" of knowledge utilization (Caplan, 1979), and the pattern of factor loadings reported by Weiss and Bucuvalas (1980a) in their study of the frames of reference of mental health policymakers. In turn, evaluative claims often reflect tests of relevance shared primarily by philosophers and social critics, for example, those who see in policy analysis an ideology in disguise (Tribe, 1972). In each case the purposes of knowledge, as reflected in these four types of claims, affirm or diminish the relevance of that knowledge to different stakeholders.

The application of a relevance test does not guarantee that a knowledge claim will be regarded as sufficiently cogent or forceful. Tests of cogency are dependent on the relative force expected of a claim in particular circumstances. Hence, an advocative claim accepted as relevant to the aims of a particular stakeholder will not necessarily be viewed as cogent. Tests of cogency, which are an extension of Toulmin's qualifier, are evident in the practice of different professions. For example, members of the legal and medical professions use similar tests of relevance but different cogency tests (compare Holzner and Fisher, 1979:235-36). Members of the legal profession typically employ a conservative cogency test (qualifier) for knowledge claims offered in criminal cases: Defendents are presumed innocent until proven guilty. By contrast, members of the medical profession often use a liberal test of cogency for claims surrounding the treatment of illness: Patients are presumed to be ill, and treated, until proven otherwise. In the first case the problem is to avoid "false positives," while in the second it is to avoid "false negatives." In other cases cogency and relevance interact, for example, when school officials set stringent confidence intervals in validating the results of achievement batteries which will be used to recommend students for jobs or further education, but apply liberal tests of cogency when assessing the effects of existing curricula on student achievement scores.

The appraisal of knowledge claims is not exhausted by tests of relevance and cogency. Knowledge claims, apart from their relevance, derive force or cogency from truth tests. Truth tests may be represented in terms of different sets of assumptions and underlying presuppositions used to transform data into claims in a practical or theoretical argument. Truth tests are standards for appraising the adequacy of knowledge claims, for example, by challenging the causal assumptions which underlie a claim.

By contrast, tests of cogency and relevance are standards for appraising the requisite force and contextual appropriateness of a claim, respectively. Typically, tests of adequacy and relevance are discrete assumptions, standards, or rules, while tests of cogency are best represented in terms of varying levels of force required of a claim. Knowledge claims which are adequate and cogent may be irrelevant, while claims that are relevant may lack adequacy and cogency alike. For example, government-sponsored program evaluations may be regarded as relevant to the aims of reform-minded social scientists but nevertheless lacking in adequacy and cogency when assessed according to standards of research quality generally accepted by social scientists. (Bernstein and Freeman, 1975).

Whereas tests of relevance and cogency appear to be comparatively simple, truth tests are complex. Many options for classifying truth tests are available in the writings of philosophers, anthropologists, sociologists, and other social observers and critics. For example, Peirce's contrasts among alternative methods of "fixing belief" (see Buchler, 1953) and Malinowski's essays on science, magic, and religion (Malinowski, 1948) point to a range of truth tests used to assess the adequacy of knowledge claims. Similarly, Montague (1925) and Wallace (1971) distinguish alternative modes for generating and testing the truth of statements about the world, modes which differ along three dimensions: the status of knowledge producers; the use of approved methods to produce knowledge; and the reliance on observation as a check on knowledge claims.

The experimental metaphor, as we have seen, places primary reliance on the correspondence of claims to a stable external reality and secondary reliance on procedures for determining the coherence of such claims among multiple experimenters (Cook and Campbell, 1979). Authority is also important, since claims are partly certified on the basis of their having been derived from a learning process (scientific experimentation) that is believed to be unique in its penetration of a stable and objective external reality (Campbell, 1974). The danger is that (necessarily) presumptive ontological claims about what is real or natural may improperly authenticate or certify epistemological claims about what is true (Michalos, 1981). The ontology of objectivism, when used as a justification or warrant for science, may also result in the denigration of ethics on grounds that only science produces corrigible knowledge claims (Gewirth, 1960).

The limitation of these schema is that they do not incorporate a variety of potentially important truth tests which reflect alternative modes of explanation (von Wright, 1971), different knowledge-constitutive interests (Habermas, 1971), and competing standards for assessing ethical knowledge (MacRae, 1976). Any provisional classification of truth tests should therefore permit distinctions between naturalistic, quasi-naturalistic, and practical modes of explanation, enable distinctions among standards of knowledge adequacy appropriate for the empirico-analytic, hermeneutic, and critical social sciences, and foster an open consideration of possibilities for testing ethical hypotheses.

(Place Figure 2 about here)

The following classification of truth tests (Figure 2) attempts to build upon these diverse concerns with standards of knowledge adequacy.

In contrast to Brockriede and Ehninger (1960), who employ Toulmin's model to classify artistic or rhetorical proofs, we use argument as a unifying construct to classify standards of knowledge adequacy. This extension of the transactional model proceeds from a recognition that the decisive element of most contested knowledge claims is not evidence or data (compare Campbell,

Figure 2

CLASSIFICATION OF TRUTH TESTS

Type of Warrant or Backing	Function of Truth Test
EMPIRICO-ANALYTIC	
-- Causal	A nomic connection (e.g., Boyle's Law) certifies that events described in data (D) are causally related.
-- Quasi-Causal	An apparent nomic-like connection (e.g., Toynbee's historical cycles) certifies that events described in data (D) are causally related.
-- Typological	A typology (e.g., Jung's Theory of psychological types) certifies that events, actions, or persons described in data (D) are members of some class.
-- Representational	A representational rule (e.g., the Central Limit Theorem) certifies that events, objects, or persons described in data (D) are typical or representative of some wider population.
-- Analogical	An analogy or metaphor (e.g., the servomechanisms of systems theory) certifies that relations among events, objects, or persons described in data (D) are similar to those contained in the metaphor or analogy.
INTERPRETIVE	
-- Teleological	A statement about individual purposes, intentions, motivations, or reasons (e.g., goals of policymakers or social scientists) certifies that actions described in data (D) are causally related to such purposes.
-- Quasi-Teleological	A nomic connection (e.g., Ashby's Law of Requisite Variety) certifies that collective actions described in data (D) are causally related to collective purposes.

Figure 2 (CONT'D)

PRAGMATIC	
— Clinical	A symptomatology (e.g., the F-Scale or the MMPI) certifies that symptoms described in data (D) are indicative of an abnormal or normal, deviant or healthy state.
— Comparative	A parallel case or experience (e.g., socialized medicine in the United Kingdom or PPBS in the Defense Department) certifies that events or actions described in data (D) are similar in their effects to those of the parallel.
AUTHORITATIVE	
— Personal	The achieved or ascribed status of knowledge producers (e.g., gurus, scientists, or expert commissions) certifies that information described in data (D) is accurate, precise, or reliable.
— Ideological	An established belief or doctrine (e.g., scientism, capitalism, socialism) certifies that ideas described in data (D) are orthodox.
— Ethical	A norm, value, or principle (e.g., Rawls' principle of justice or the Pareto Criterion) certifies that actions described in data (D) are justified.
-- Methodical	The use of an approved method (e.g., path analysis or phenomenology) certifies that information described in data (D) is accurate, precise, reliable, and valid.
CRITICAL	
— Ontological	A presumption about the nature or reality of valid knowledge (e.g., objectivism or subjectivism) certifies that ideas described in data (D) are true or right.
— Emancipatory	A presumption about the liberation of human potential (e.g., self-actualization, Theory-Y, homo laborans) certifies that ideas described in data (D) are true or right.

1974; Popper, 1961), but the underlying standards of appraisal which warrant the transformation of data into claims. Data themselves are rarely conclusive; most social theories are therefore radically underdetermined by data (see Hesse, 1980).

Equally important for our purposes, contexts of practical action appear to be radically underdetermined by generalizable standards or rules. As Knorr (1981) argues, practical action is indexical and indeterminate insofar as "rules and decision criteria, and more generally definitions of the situation, are interpreted in context...it is the concrete, local translation of rules or decision criteria which determine the selections that are made, and which subsequently shape the outcomes of these selections." At the same time the underdetermination thesis, whether applied to theory or to practice, does not entail the conclusion that knowledge claims are properly explained solely in terms of externally imposed "sociological" factors (Laudan, 1981), since diverse standards or rules for certifying and challenging the adequacy of knowledge claims may hold as much or more explanatory import as do variables such as social structure (see Laudan, 1977).

Truth tests may be classified according to the general and specific functions they perform in knowledge transactions. These general functions are (1) empirico-analytic: knowledge adequacy is certified by assumptions about the logical consistency of axioms, laws, propositions, hypotheses, or principles and/or their correspondence to empirically observed regularities; (2) interpretive: knowledge adequacy is certified by assumptions about the action-motivating significance of purposes, intentions, reasons, or motivations; (3) pragmatic: knowledge adequacy is certified by assumptions about the effectiveness of past experiences in producing desired outcomes in parallel contexts; (4) authoritative: knowledge adequacy is certified by assumptions about the achieved or ascribed status of knowledge producers, the orthodoxy of knowledge, or the use of approved methods; and (5) critical: knowledge adequacy is certified by assumptions about the consequences of such knowledge in emancipating individuals and collectivities from unexamined or tacit beliefs that impede the realization of human potential.

Tests of truth, relevance, and cogency are distinct but interrelated standards for appraising knowledge claims. These three general classes of tests, together with specific variants, govern the adequacy, appropriateness, and requisite force of knowledge which offers solutions for practical problems. Truth, relevance, and cogency tests are potentially independent, although the force of a knowledge claim (cogency test) frequently depends on prior assessments of relevance and adequacy. The reverse is generally not true, since various tests of cogency (for example, tests of statistical significance) seldom establish the relevance or adequacy of knowledge claims. These generalizations and the typology on which they are based are hypotheses, merely. With Weiss and Bucuvalas (1980a), we are not investigating these and other components of frames of reference in concrete settings of practice.

THREATS TO USABLE KNOWLEDGE

In further extending the transactional model we may view threats to knowledge claims as rebuttals (R) to practical and theoretical arguments which affirm, explicitly or implicitly, the adequacy, cogency, or relevance of knowledge. In contrast to other approaches which encourage the separate exploration of rival hypotheses about causation (e.g., Cook and Campbell, 1979), or those dealing with ethical norms (e.g., MacRae, 1976) the function of threats to knowledge adequacy, relevance, and cogency is to challenge both the substantial and analytic bases of empirical as well as normative claims. Therefore, while threats to adequacy, relevance, and cogency provide alternative interpretations of the same data or evidence, they are not limited to assessments of the validity of causal inferences.

Figure 3 summarizes three classes of threats to usable knowledge. The majority of these threats reflect methodological and practical issues not addressed by Campbell and Stanley (1963) and Cook and Campbell (1979) in their listing of classes of threats to the internal, external, and statistical conclusion validity of causal inferences. Indeed, and as repeatedly noted, these validity threats are exclusively oriented towards standards of adequacy and relevance which are causal and designative, respectively. The one exception to this exclusive concentration on causal and designative standards is "irrelevant responsiveness of measures," a threat to external validity where the imperfect validity of measures in adequately representing experimental outcomes valued according to conflicting standards held by diverse stakeholders is overcome by multiple operationism and triangulation (Campbell, 1975b:79-80; Campbell and Fiske, 1959; Webb et al., 1966). This threat to validity implies an interpretive test which is not easily reconciled with an experimentalist platform which contends that outcomes should be independent of the preferences of different stakeholders (Campbell, 1979b).

Threats to the usability of knowledge may be divided into three classes: cogency, relevance, and adequacy (Figure 3). Threats to the cogency of knowledge claims are of two main types: misjudged cogency and misplaced cogency. Misjudged cogency, a topic of standard statistical textbooks, is illustrated by errors of practical judgment which occur when one sets statistical confidence limits too high (Type I Error) or too low (Type II Error) in testing the null hypothesis. By contrast, misplaced cogency occurs when one correctly sets statistical confidence limits but addresses the wrong problem. The threat of misplaced cogency is evident in John Tukey's admonition to applied social researchers: "Far better an approximate answer to the right question, which is often vague, than an exact answer to the wrong questions, which can always be made precise" (quoted by Rose, 1977:23). This first-order threat has been generalized by Kimball (1957), Raiffa (1968), and Mitroff (1974) as Error of the third Type (E_{III}) and discussed by Campbell and Stanley (1963:6-7) under the heading of misplaced precision in one-shot case studies.

Threats to knowledge relevance are also of two main types: misplaced relevance and untimely relevance. Misplaced relevance involves the projection of cogent knowledge claims which are relevant to one kind of purpose when, instead, cogent knowledge claims relevant to another kind of purpose should have been produced. This second-order threat is noted with great frequency in published literature on policy research (for example, Coleman, 1972; Rein and White, 1976). The threat of misplaced relevance is also noted by proponents of multiattribute utility analysis who contend that experimental program evaluations offer designative claims but not evaluative and advocative ones (Edwards, Guttentag, and Snapper, 1975:140). By contrast untimely relevance, a second-order threat that is more easily overcome, involves the production of relevant information too late to satisfy the needs of one or more stakeholders (see, for example, Weiss, 1977).

Threats to knowledge adequacy are more diverse and complex than those pertaining to relevance and cogency. Among the major threats to knowledge adequacy are:

1. Misplaced Adequacy: The use of the less appropriate of two or more classes of truth tests when, instead, the more appropriate truth test should be employed. This second-order threat is found in theoretical and practical disputes surrounding the appropriateness of contending worldviews, paradigms, and frames of reference for policy research (for example, Tribe, 1972; Patton, 1975; Rein, 1976; MacRae, 1976).

2. Subjectivity: A classical causal test is used to explain human behavior when, instead, the explanation should be supplemented or replaced by one founded on subjectively meaningful action. Claims about the effectiveness of federally-sponsored social experiments are frequently challenged on grounds of subjective inadequacy (e.g., Trend, 1978), another second-order threat.

3. Reflexivity: A quasi-causal test is used to affirm the social or historical necessity of some process or event when, instead, such processes or events are subject to human reflection, initiative, and control. This second-order threat is sometimes applied to quasi-causal theories of revolutionary social change. Such theories are challenged on grounds that predictions of socio-historical events hold true if and only if reflection by stakeholders does not lead them to change their values or behavior; or if unpredictable factors that arise through creative reformations of social problems do not intervene (MacIntyre, 1973).

4. Misclassification: This second-order threat may be invoked to determine whether a typological test results in the placement of events, actions, or persons in the wrong class. The creation of social pseudo-problems by labelling healthy persons as deviants reflects classificational inadequacies that derive from unexamined paradigms and social myths (see, for example, Lowry, 1974; Gregg et al., 1979).

5. Misrepresentation: The use of a particular representational test, whether statistical or theoretical, when another more representative rule should have been employed. The underenumeration of minorities in the 1970 U.S. Census illustrates this second-order threat.

6. Perspectivity: The use of an analogical test as a literal surrogate for some social process when, instead, the analogy is no more than a perspective or metaphor of that process. Challenges to the adequacy of quantitative policy models illustrate this second-order threat to metaphorical adequacy (e.g., Strauch, 1976).

7. Objectivity: The use of a teleological test to explain action when, instead, the explanation should be supplemented or replaced by a quasi-causal test which identifies the operation of humanly objectivated but unreflected law-like regularities. The concept of unanticipated social consequences and the "self-fulfilling prophecy" illustrate this second-order threat (Merton, 1976).

8. Spuriousness: Use of a clinical test involving one symptom or set of symptoms to diagnose or treat a social ill when, instead, some other symptom or set of symptoms is a better indicant of the problem. Knowledge about the diagnosis and treatment of mental and physical illnesses is often subject to second-order threats of spurious symptomatology.

9. Misplaced Comparison: Use of a comparative test to adopt a reform that has succeeded elsewhere when conditions surrounding the reform are not sufficiently similar to the case at hand. Misplaced comparison is a continuous second-order threat to knowledge claims about government-sponsored "exemplary" projects.

10. Counterauthentication: Use of a personal, ideological, ethical, or methodical test when some other person, doctrine, norm, or procedure is more qualified, orthodox, fair, or sanctioned. Knowledge produced by mystics, seers, gurus, scientists, and expert panels and commissions is typically threatened by diverse forms of counterauthentication, as is knowledge which originates in ideological doctrines, ethical systems, and approved technical conventions of science.

11. Substantiality: A (necessarily) presumptive ontological claim about the nature of social reality, human nature, or knowledge certifies epistemological or ethical claims when, instead, such claims should be argued on substantial grounds. This second-order threat is evident in Campbell's criticisms of the naturalistic fallacy (i.e., deducing ethical from non-ethical premises) in contemporary sociobiology (Campbell, 1979a) and in efforts of critical social theorists (e.g., Habermas, 1975) to challenge presumptive ontological claims of logical positivism on grounds that such claims, since they represent conclusions of substantial arguments, are corrigible and redeemable through social discourse.

12. Misplaced Reflexivity: Claims about the emancipatory role of self-reflection and reasoned discourse are treated as if they refer to concrete contexts of practice when, instead, they are unrelated to ongoing practices. Misplaced reflexivity is a standing threat to much work carried out in ethnomethodology, phenomenology, and critical theory.

These classes of threats to knowledge adequacy may stand in a complementary relation, as when the threat of objective inadequacy induces the use of a combined teleological and quasi-causal truth test. In other cases threats to knowledge adequacy expose fundamentally irreconciliable standards of appraisal, for example, when subjective inadequacy reveals that nomic connections (laws) appropriate to knowledge claims in physics are inapplicable to sociocultural systems. Finally, threats to knowledge adequacy may be extended in the form of additional classes. The framework described above makes no claim to exhaustiveness or universality.

(Place Figure 3 about here)

Figure 3

THREATS TO USABLE KNOWLEDGE

Class/Type	Representative Threat
THREATS TO COGENCY	
-- Misjudged Cogency	Setting statistical confidence limits too high (Type I Error) or too low (Type II Error) in testing the null hypothesis
-- Misplaced Cogency	Correctly setting statistical confidence limits for the wrong problem (Type III Error)
THREATS TO RELEVANCE	
-- Misplaced Relevance	Production of cogent knowledge claims that are relevant to the wrong purpose
-- Untimely Relevance	Production of cogent and relevant knowledge claims too late
THREATS TO ADEQUACY	
-- Misplaced Adequacy	Use of less appropriate of two or more classes of truth tests when, instead, a more appropriate truth test should be employed
-- Subjectivity	Use of causal test when explanation should be supplemented or replaced with one based on subjectively meaningful action
-- Reflexivity	Use of quasi-causal test without recognition that social processes are subject to human reflection, initiative, and control
-- Misclassification	Use of typological test results in placement of events, actions, or persons in wrong class
-- Misrepresentation	Use of less appropriate of two or more representational tests, whether statistical or theoretical

Figure 3 (CONT'D)

-- Perspectivity	Use of analogical test as literal surrogate rather than perspective or metaphor
-- Objectivity	Use of teleological test when explanation should be supplemented or replaced by quasi-causal test which identifies humanly objectivated but unreflected law-like regularities
-- Spuriousness	Use of clinical test involving a set of symptoms which are less appropriate diagnostic or treatment indicators than another set of symptoms
-- Misplaced Comparison	Use of comparative test when two or more cases are not similar
-- Counterauthentication	Use of personal, ideological, ethical, or methodical test when some other person, doctrine, norm, or procedure is more qualified, orthodox, fair, or scientifically sanctioned
-- Substantiality	Use of a (necessarily) presumptive ontological claim to certify epistemological or ethical claims when, instead, such claims may be argued on substantial grounds
-- Misplaced Reflexivity	Claims about the emancipatory role of self-reflection and reasoned discourse are treated as if they refer to concrete contexts of practice when, instead, they are unrelated to ongoing practices

CONCLUSION

Problems of knowledge production and use cannot be satisfactorily clarified or alleviated by making exaggerated and facile distinctions between professional social inquiry and ordinary knowledge; nor should we accept the patently false conclusion that knowledge derived from one or the other source is inherently superior. The task is rather to distinguish between approaches to knowledge creation and use which recognize the critical function of reason in appraising knowledge claims and those which do not. The metaphor of the experimenting society, while it has introduced reasoned discourse into the examination of causal inferences, fails to recognize that reforms are symbolically mediated social processes aiming at changes in the structure and functioning of some social system. Accordingly, experimental outcomes cannot be said to be independent of the preferences of stakeholders in social reforms.

The success of reforms depends upon rationally motivated consensus that some future social state is possible and desirable. Reforms are processes of reasoned argument and debate where competing standards for appraising knowledge claims include but are not limited to rules for making valid causal inferences. The jurisprudential metaphor not only captures these diverse standards for assessing knowledge claims; it also directs attention to processes of knowledge creation and use as critical social transactions involving issues of the comparative adequacy, relevance, and cogency of knowledge claims.

The jurisprudential metaphor has been extended and specified in the form of a transactional model of argument. The transactional model, since it distinguishes between analytic and substantial arguments, is well-suited for critical inquiries into competing standards for assessing theoretical and practical claims alike. The transactional model provides a visual schema for mapping arguments, compels a reflective and critical posture towards presuppositions of knowledge claims, yields a classification of truth, relevance, and cogency tests, and permits a provisional listing of classes of threats to usable knowledge. The role of the transactional model is not limited to retrospective inquiries into standards of knowledge assessment employed by contending stakeholders, since an awareness of threats to usable knowledge helps anticipate diverse challenges to knowledge claims. By supplying the contours of a critical social science of knowledge applications--that is, a social science which uncovers and raises to a level of explicit consciousness those unexamined prior assumptions and implicit standards of assessment that shape and distort the production and use of knowledge--the transactional model may contribute to individual and collective learning capacities and, thus, to emancipatory social reforms.

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X

FRAMES OF REFERENCE AND PREDICTION OF KNOWLEDGE USE

Burkart Holzner and Leslie Salmon-Cox

Introduction: The Concept Frame of Reference
The Dimensions of Frames of Reference
The Social Organization of Frames of Reference
Frames of Reference in the Knowledge System
Observations on Frames of Reference in Education
Frames of Reference and the Prediction of Knowledge Use

ABSTRACT

This paper discusses the concept, frame of reference and the interplay between the individual's frame of reference, his or her location in social structure, and perceived responsibilities. The components of frames of references are examined for knowledge producers and teachers as potential knowledge users. Frames of reference are a critical intermediary between knowledge and its use and therefore our attention to frames of reference is necessary for predicting knowledge use.

FRAMES OF REFERENCE AND THE PREDICTION OF KNOWLEDGE USE

By

Burkart Holzner and Leslie Salmon-Cox

Introduction: The Concept Frame Of Reference

All cognitive activity, whether of the scientific, professional, or commonsense variety, establishes meanings by relating an object of inquiry to other objects, to standards of judgment, and underlying assumptions thus enabling persons to arrive at interpretations that appear to them sensible and grounded. The concept "frame of reference" denotes a structure of those underlying assumptions, standards and interests that provide the framework to which specific interpretations are related and within which they make sense.

The significance of frames of reference is rather obvious when we make judgments, for example about temperature. The weather forecast that would call a day in July "cold" in the Northern hemisphere would surely call the same temperature "warm" if it happened in January. Similarly obvious is the role of spatial frames of reference in our orientation to what is up or down, left or right, forward or backward. We are familiar with frames of reference in political judgment when we classify opinion as right of left, conservative or progressive.

The term "frame of reference," while gaining somewhat broader currency recently, traditionally has been used both in methodology to describe the status of certain assertions, and in social science, where it has been used to describe or explain certain cognitive phenomena. For example, E. W. Hobson (1923) distinguished between two types of concepts in science, those that have direct observational counterparts, and those that do not. These latter concepts, Hobson says, "are formed by an effort of constructive imagination for the purposes of the representative scheme" (Hobson, 1923:23). They thus function as components of a frame of reference. Such frames as a whole cannot be inferred from experience but are necessary to make meaningful observations. The same use was made of the term by sociologists like Howard Becker, and Talcott Parsons and Edward Shils. For example, Parsons and Shils state "the frame of reference of the theory of action involves actors, a situation of action, and the orientation of the actor to the situation" (Parsons and Shils, 1952:56). This conceptual framework is proposed as a necessary set of a prioris for social science. In this meaning the term is used to denote a set of assumptions necessary to determine the subject matter to be studied, and the orientation to such study.

In early cognitive psychology the concept was elaborated by Muzafer Sherif (1936:33). "When we say 'up,' we mean 'up' in relation to something that is below. When we say 'far' we mean 'far' in relation to something near". The properties of perceived phenomena are then assessed by the subject in relation to some standard, they are not simply results of the stimulus itself. Sherif and Cantril then defined the concept frame of reference as follows:

> The term "frame of reference" is simply used to denote the functionally related factors (present and past) which operate at the moment to determine the particular properties of a psychological phenomenon (such as perception, judgment, affectivity) (Sherif and Cantril, 1947:34).

It is interesting to note that the frame of reference phenomenon, namely the fact that respondents interpret stimuli in terms of their own definitions of the situation rather than that of an investigator, was perceived as a nuisance in social research. For example, Charles F. Cannel and Robert L. Kahn in their chapter on interviewing in the Handbook of Social Psychology (1968) deal with the frame of reference problem as it impinges on inquiry.

> In formulating questions the research worker has only three possibilities with respect to the frame-of-reference problem. He can ignore it, he can attempt to

> ascertain it, or he can attempt to control it. The first is risky and often leads to difficult problems of interpretation. The second and third deserve more consideration.

They indicate that to ascertain the subject's frame of reference, one needs to probe into the reasons for respondents' answers. And then they continue to say:

> Nevertheless, the task of ascertaining frame of reference can be cumbersome, and the researcher probably is more often interested in controlling it. Without taking much interviewing time to make a particular frame of reference explicit to the respondent and without attempting to ascertain the frame of reference each respondent is using, the researcher wants nevertheless to be reasonably confident that the respondent answers the question within the terms of reference the researcher had in mind when he formulated it. Moreover as many respondents are to be interviewed, the researcher wants to be sure that each of them is answering the question from the same reference so that their responses are comparable.

They make several practical recommendations as to how this might be done. Clearly, this treatment of the subject deals with reference frames as troublesome problems in measurement.

This attitude seems to have continued also in much of the work on knowledge utilization until recently. Product oriented or physicalist theories of knowledge utilization tend to be relatively insensitive to the frame of reference phenomenon. In this paper we are taking the opposite position. Since knowledge utilization is always cognitive activity of some kind, it always occurs within the actors' frames of reference. Furthermore, such reference frames are ascertainable and their structure and texture can be both described and explained. We see such frames of reference from the sociologial perspective as anchored in patterned social organization and based upon the cognitive requirements of socially mandated role responsibilities.

The frameworks of assumptions and direction-giving cognitive interests within which meaning structures emerge is certainly a complex phenomenon when dealing with intellectual activity and professional work. And yet, the frames of reference of complex fields of inquiry such as scholarly disciplines and their various branches and twigs, as well as the practicing professions and occupations, can certainly be described and analyzed. Much of an illuminating nature has been written about "the sociological perspective," characterizing in broad and general terms the frame of reference of an entire discipline within which there are many competing perspectives and schools, and the same can be said for psychology, or biology, or the like.

However, in order to understand the way in which we propose to use the concept frame of reference, we must broaden our purview and draw on the basic sociological notion that for every specific social role one can describe a required, or encouraged, perspective which, so to speak, constitutes the terms of reference and perspective for that role. In the broadest sense, then, we mean by frame of reference the structure of orientation of actors that is anchored in their responsibilities and commitments and involves, significantly, mandated or preferred cognitive resources as well as standards of judgment.

We are thus using a concept that is considerably broader than Thomas Kuhn's concept "paradigm" (Kuhn, 1962; 1970; Suppes, 1974). Paradigms order the structure of knowledge in a field of inquiry in relation to exemplary feats of research and theory. Multiple paradigms may well occur within one institutionalized frame of reference, but paradigm shifts may indeed alter such frames. Further, the idea of paradigms emphasizes quite strictly the structure of intellectual activity and the resulting knowledge structures as such, and it is useful in this context. But by our relating frames of reference to social roles and thus to institutions and organizations, we mean to emphasize their social anchorage and the social organization of cognitive activity. We are doing this, as the body of this paper will make clear, because of the significant insights into the uses of knowledge that can be gained in this manner.

At this point we must forestall a misinterpretation which for some readers will be close at hand. It is the notion that the use of concepts like frame of reference and paradigm requires one to adopt a relativistic epistemology, or a sociological reductionism. Some writers seem to have concluded from the empirical fact that inquirers in different communities proceed in terms of often drastically divergent frames of reference as well as paradigms, that the resulting claims to knowledge can only be judged in relation to the standards and beliefs in terms of which they were originally offered. Ultimately, this may lead to the belief that the validity of knowledge claims can only be established by creating—in whatever manner—social consensuses that they are correct. In some arguments, standards of truth are thus simply reduced to impositions of social power. These conclusions seem to us not only unnecessary but also false.

Not only specific substantive knowledge claims can be critically scrutinized (and this always occurs within the structure of some frame of reference), but frames of reference themselves, and especially the standards of judgment they encompass, can and have been the subject of critique. History offers little support for the view that all knowledge claims and all frames of reference were of equal merit—on the contrary there has occurred and is occurring now a process of critique on the basis of increasingly universal standards of judgment. Rational inquiry has led to hard and compelling conclusions which remain valid despite the disagreement of multitudes. Indeed, we consider the investigation of frames of reference to be one aspect of the critical extension of rationality, not an intrusion of irrationality.

The Dimensions of Frames of Reference

In an empirical inquiry into the dimensions of reference frames, Holzner, Mitroff, and Fisher (1976) studied in detail the frames of reference of several scholars who had conducted significant social inquiries in law, psychiatry, psychology, and sociology.* In this inquiry a set of nine categories emerged which, taken together, permit the comprehensive description of frames of reference. We will use these categories here in order to demonstrate the multidimensional structure of frames of reference. The categories are:

1. Commitments and Responsibilities:

Role responsibilities and commitments are certainly the grounding of frames of reference that provide moral as well as motivational foundations. These commitments often constitute a structure which serves as a basic code for inquiry that provides generative rationales for the direction and conduct of cognitive activity. This code, depending on the nature of responsibilities, can be described with regard to differentiation, complexity, unity, and organization. Clearly, certain occupational and professional roles require that highly divergent situations be dealt with that are difficult to integrate. Other roles, by contrast, may deal with relatively unitary sets of responsibilities.

2. Problem Selection and Formation

The manner in which problems are detected and formed into questions so that a solution can be pursued differs across frames of reference, largely as a function of the conception of what an acceptable solution to the problem can possibly be. For example, the solution of a research problem in psychology may not at all appear to a teacher as having anything to do with the solution of a concrete pedagogical problem in the classroom. This dimension of frames of reference is particularly important to ill-structured problems. *

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*Note: A report on this work is available in the knowledge use working paper "An Empirical Investigation of Frames of Reference" (Holzner, Mitroff and Fisher, 1976) which summarizes the frames of reference [illegible]y of 1975-1976.

3. Strategies of Problem Solution

For each frame of reference, one can describe a set of preferred modes for solving problems. This, of course, will depend on the available cognitive resources and especially involves the setting of intermediary goals in relation to an ultimate goal.

4. Rules of Inquiry and Analtyical Devices

This category is used to describe the inquirer from the point of view of his subscription to certain rules of inquiry which are considered valid by him and his preference for or competency in the use of certain methodological and analytical devices. Professions both of the consulting and practicing variety as well as disciplines go to great lengths in attempting to set standards for rules of inquiry and methodologies.

5. Conceptions of the Nature of Facts

Conceptions of "facticity" come in a variety of forms. Facts may be rank ordered by an inquirer according to their significance or triviality, or they may be distinguished as relatively soft versus relatively hard facts and the like. This has much to do with the trustworthiness of knowledge and the core realities to be dealt with in terms of the frame of reference.

6. Truth Tests

Truth tests are validations of the basic beginning points as well as knowledge outcomes in terms of critical, socially and culturally structured occasions. Truth tests themselves are normally believed to require no further validation. It is through

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*See for example Mitroff, Bets, Pondy, and Segasti (1974).

the connection of knowledge claims with these occasions for critical examination that knowledge acquires the stigmatization of representing reality. Truth tests can be directed at issues of relevance, cogency, and knowledge adequacy.

Truth tests range over a wide spectrum from the empirical and rational tests of science to mystical tests to which "inner experience" may be subjected. In a practical profession such as teaching a variety of pragmatic truth tests are likely to play a major role.

7. Delimiting the Domain of Inquiry: The Nature of Boundaries

Frames of reference orient one to a variously delimited "field." The boundaries may be drawn with great precision and finality, or may be very diffused. The category includes as well conceptions of alternative frames of reference and rules for bridging framework boundaries as well as maintaining them.

8. Articulation and Codification of the Frame of Reference

A frame of reference may be symbolically articulated as a structured cultural object, and/or it may be codified into interpersonally shared, institutionalized, rule systems. There is, of course, a difference between articulation and codification. A codified frame of reference is necessarily an institutionalized one. It is this aspect of codification that has a particular impact on patterns of knowledge use. Codification includes such things as formal training curricula, examinations and certifications, as well as particular requirements for the way in which one deals with knowledge. Certainly, very idiosyncratic frames of reference can be articulated and they have been. Inarticulated, implicit reference frames can often be found, for example, in the taken-for-granted commonsense of a community. Frames of reference of teachers are usually of the implicit rather than articulated and codified variety. In this regard they are in sharp contrast to the frames of reference of researchers who are required to make their assumptions and methodologies as explicit as they can manage.

9. Reflectivity

Reflectivity refers to the ability of a subject to view himself as an object. Frames of reference differ very sharply in the degree of reflectivity. In general, the more reflective frames we would expect to be more effective in adequately assessing and critiquing other frames.

This listing of categories for the description of frames of reference emerged from the close-up, empirical study of scholarly reference frames which we cited above (Holzner, Mitroff, Fisher, 1976). It is therefore somewhat slanted in the direction of articulated, codified, reflective, and very complex reference frames. However, we do feel that this inventory may have a certain practical utility in directing attention to critically important aspects of reference frames which need to be taken into account as one thinks about knowledge utilization plans. It is, for example, unlikely that knowledge studies not clearly linked to responsibilities will be perceived as relevant for use. Or, knowledge claims proffered in a style violating preferred knowledge adequacy standards are likely to be rejected.

But we must increase the complexity of our analysis somewhat in order to be adequate to our task. Frames of reference are not only individual attributes, they occur in the context of social organization and structure. We will now turn first to the task of reviewing the social organization of a frame of reference in its institutionalized form, and then turn to the location of frames of reference in the knowledge system of a society.

The Social Organization of Frames of Reference

Frames of reference can be described at the individual, the collective, the organizational, and the institutional levels. Any individual could be described in terms of the set of frames of reference available for structuring cognitive activity. Frames of reference can be said to occur at the collective level to the extent that they are shared across sets of individuals. However, such sameness of perspective does not necesarily imply institutionalization or structure. The organizational level is of particular interest to us as frames of reference can be said to be characteristic of organizations (Blau and McKinley, 1979) and because codified frames of reference themselves require structured organizations for their operation and maintenance. In the case of the professions such structured organizations have become fully institutionalized and their frames of reference are thus embedded in socially sanctioned and often legally anchored institutions.

Since our task is to exlore the predictive utility of the concept frame of reference for knowledge utilization especially in institutional and organizational settings, we will deemphasize the individual or personal level. This, of course, should not be taken to mean that individual variation, based upon socialization, formal education, life histories as well as personality characteristics, is unimportant—on the contrary. The world views and perspectives of leaders have, for example, for good reason, received enormous attention in the scholarly literature. Innovators and entrepreneurs have often played major roles in organizational change and in the development and adoption of innovations. However, it is at least equally appropriate to focus in the context of this paper at the level of social organization.

To help us with a first orientation to the matter, let us take a very brief look at an area in which the institutionalization as well as social organization of frames of reference is particularly apparent: the institutionalized forms of intellectual activity. From this we will turn to the institutinalization of frames of reference in practicing professions. What we have in mind here is analyzing certain organizational structures from the point of view of their serving as social frameworks for knowledge. Edward Shils gives a very useful and precise explication of what this notion involves:

> Institutions create a resonant and echoing intellectual environment. . .by institutionalization of an intelletual activity I mean the relatively dense interaction of persons who perform that activity. The interaction has a structure: the more intense the interaction, the more its structure makes place for authority which makes decisions regarding assessment, admission, promotion, allocation. The high degree of institutionalization of an intellectual activity entails its teaching and investigation within a regulated, scheduled and systematically administered organization. The organization regulates access through a scrutiny of qualification, provides for organized assessment of performance, and allocates facilities, opportunities, and rewards for performance—for example, study, teaching, investigation, publication, appointment, and so forth. It also entails the organized support of the activity from outside the particular institution and the reception or use of the results of the activity beyond the boundaries of the institution. An intellectual activity need not be equally institutionalized in all these respects. It should be remembered that an intellectual activity can be carried out fruitfully with only a rudimentary degree of institutionalization (Shils, 1970).

A specialist in any field, be it nucclear physics of the study of classics, educational research or sociology, is carefully educated to internalize a frame of reference that emphasizes his or her core responsibilities, commitments, truth tests, etc. This frame of reference is clearly interactive and interdependent with the organizational structures which Shils points to in his description of institutionalized intellectual activity. Thus, adherence to the frame of reference becomes an official requirement,, departures or innovations needing to be justified by elaborate argument. Graduate education demands that students master an appropriate manner of forming problems, and that they be aware of the problem priorities as they are pursued in their discipline. Strategies of problem solution, methodologies, and standards as to the nature of fact are hardly matters of great permissiveness. At the same time, it is the case that they differ widely across disciplines and professions as much as the specific nature of reality or truth tests.

We draw from these facts the more general conclusion that institutionalized frames of reference are embedded in structured social frameworks for knowledge. The idea that groups, solidarities, organizations, or communities are also frameworks of knowledge has first been formulated by Gurvitch in his work The Social Frameworks of Knowledge (1972). He examines in this work how local groups develop their own modes of knowing. In another illustration he explores in detail how forms of knowledge are embedded in the social organization of a factory. The important point is that such social organizational patterns are linked to the way in which tasks are organized, knowledge resources stored, so that cognitive activity can function within the structure of the institutionalized frames of reference.

The practicing and consulting profession can be considered elaborate frameworks for knowledge. The profession of medicine provides an example of a particularly highly structured social framework for knowledge, whereas such professions as social work, education, counselling are much less structured by comparison. These social frameworks for knowledge, in the case of the practicing professions, are necessarily organized around the central practical responsibilities of the profession and the core social performances and identities with which it deals. This point is well made by Freidson about the profession of medicine:

> Within its own institutions, protected by its organized autonomy, the profession has developed knowledge of its own, and by virtue of being a consulting profession, a capacity of its own to shape the behavior and experience of the layman independently of the lay community. In those institutions the profession does not merely treat a biological state by biochemical or physical technique: it also organizes the social identity of the layman into being a patient. Thus, in applying its knowledge, the profession cannot avoid making social as well as "purely medical" decisions about the people it deals with . . . when an occupation arises to serve some need or demand on the part of the lay community, and subsequently succeeds in becoming a profession, it gains the autonomy to become at least in part self-sustaining, equipped to turn back and shape, even create that need anew, defining, selecting, and organizing the way it is expressed in social life (Freidson,1970).

The analysis of frames of reference as predictive tools for knowledge utilization requires attention to the struture of the frames of reference themselves but also to the social frameworks for knowledge in which they are embedded. This point goes evey beyond the argument offered by Nathan Caplan (1979) in the two-communities theory of knowledge utilization, which deals essentially with the gap between social scientists as knowledge producers and policy makers. Within a somewhat different conceptual framework an approach highly sensitive to the points about the nature of social organization and frames of reference has been developed by Paul Hood (1976). In this study data are collected on the characteristics and information needs as well as information dissemination patterns through survey instruments and field interviews with persons who represented a great variety of educational roles as well as different locations.*

Having given consideration to the issues of social organization surrounding particular frames of reference, we now must turn to the more encompassing context in the societal knowledge system within which the structures we have discussed this far have their location.

See also Hood and Cates, 1978.

Frames of Reference in the Knowledge System

While in the previous section we have dealt with the social organization of frames of reference in the sense of asking the question what social arrangements, resources, controls, and the like sustain a given framework and perspective, we must also ask the question of the distribution and location of the socially organized frameworks within society itself. For this purpose the concept of the social knowledge system is useful.

This conception is related to the already cited work of George Gurvitch (1972) on social frameworks of knowledge, but it was even more clearly articulated in the studies of the economist Fritz Machlup. Especially important was his book The Production and Distribution of Knowledge in the United States (1962) and the more recent work Knowledge: Its Creation, Distribution, and Economic Significance. Vol. I. Knowledge and Knowledge Production (1980) and Vol. II. The Branches of Learning (1982). Machlup, as the title of the first book indicates, concerns himself with the role of knowledge in the economic system, its production and distribution. This was at the time a novel conception which caused many shocked misunderstandings since knowledge was treated like other economic goods.

Holzner and Marx (1979) developed the sociological notion of the knowledge system in society by drawing attention to the fact that certain analytically distinct aspects of social systems come into focus when one attends to the structured distribution of knowledge related activities, institutions, organizations, roles, persons, and resources. Thus the conception of the social knowledge system is akin to that of other analytical concepts focusing on specific aspects of social systems such as the power structure, or the communications network, or the economic system, and others. Obviously, each of these modes of abstracting from the complex reality of society is interdependent with all the others. Surely, there are relationships between social systems of power and of knowledge. However, it is fruitful for the task at hand to focus on the knowledge system itself.

Holzner and Marx used five knowledge functions to differentiate components of the knowledge system, namely knowledge production, the organization of knowledge into coherent bodies, knowledge storage, knowledge distribution and accessing, and knowledge use. Intersecting these functional differentiations are major institutional domains such as education, health care, social policy, and innumerable others. Further, distinctions needs to be made concerning the relative centrality and peripherality of these domains. For example, while great efforts have been made in recent years to increase the scope and quality of educational knowledge production, it can hardly be claimed that the educational profession, especially those dealing with elementary education and their social frameworks for knowledge, occupy a highly central place in the American knowledge system.

If we look at the flows of knowledge through the system to the various points at which knowledge is put to use, that aspect especially of institutionalized frames of reference that we have called truth or reality tests becomes particularly significant. It serves in part as a set of filters impinging on the channeling of knowledge flows and directing them. That is, from the point of view of each frame of reference, knowledge claims are critically examined as to their relevance, adequacy, and cogency. Relatively few studies are available that deal explicitly and empirically with the nature of truth tests. An important exception is the work of Carol H. Weiss and Michael Bucuvalas, (1980) who have examined the frames of reference of executives in certain administrative branches of the federal government.

Keeping in mind the strategic focus on the socially structured distribution of truth tests in relation to frames of reference and social frameworks for knowledge, we now turn to certain observations about frames of reference in education.

Observations on Frames of Reference in Education

In recent decades deliberate efforts have been made to improve the scientific knowledge base for educational policy and practice. New research and linkage organizations have been established and professional associations have .been profoundly affected by this movement. Similar efforts have been made in other fields, such as health care and mental health. The underlying belief is that policy and practice could be dramatically improved by increased reliance on high quality scientific research and by considering policy changes as experimental interpretations. This belief is well formulated by Charles A. Kiesler (1981), who writes not about education but about mental health the following:

> The potential for an effective national policy is clearly there. However, given various uncertainties in the knowledge base, the most dependable policy strategies would rest on feedback loops with evaluation and policy research. In this view, mental health policy should be well articulated, experimental in tone, and carefully oriented towards assessment of the outcomes of potential treatments and their cost effectiveness and cost benefit. If we could all agree that is indeed the wisest approach to the development of mental health policy, then we can also all agree that the current mental health policy is a failure since it is none of those things.

This stance is closely related to the philosophy and methodology formulated by Don Campbell around the notion of "policy as experiment" (1971, 1975, 1982; Dunn, 1982).

In part the science oriented reform movement has deliberately attempted to alter both frames of reference and social frameworks for knowledge in educaology formulated by Don Campbell around the notion of "policy as experiment" (1971).

In part the science oriented reform movement has deliberately attempted to alter both frames of reference and social frameworks for knowledge in education. In fact, in a few instances action was taken apparently based deliberately on the notion that planful intervention in frames of reference and social frameworks for knowledge would lead both to improved knowledge production and use. An important example is reported by Carolyn Hodges Persell in a paper she presented at the meetings of the

American Sociological Association in New Orleans in 1972, "The Utilization of Sociological Ideas in Organizational Planning, A Case Study."* In the early and mid-sixties the leadership of the American Educational Research Association, especially Richard Dershimer, who became executive officer of AERA in 1964, and John Goodlad, who was the then incoming president of AERA, became convinced that the quality of educational research and the centrality of educational research in the American knowledge system could both be improved by applying to the structure and policy formation of AERA insights gained from the sociology of science. An effort was made to cull from the body of empirical evidence and theory of the then-existing sociology of science those insights that could be translated into institutions and practices within AERA. While the concept "frame of reference" did not play a major role, ideas concerning standards of judgment, methods of evaluation, incentives and rewards, and the structuring of social frameworks for knowledge certainly did.

Dershimer had become thoroughly familiar with the sociology of science as it was formulated, for example by Warren O. Hagstrom (1965) or Bernard Barber and Walter Hirsch (1962). Dershimer was also convinced that the relative lack of influence of the educational research community could be addressed on the basis of experience gained in natural science policy and by learning from the practices of the established natural science communities.

Persell reports that these concerns were translated into a plan of action late in 1966. At that time Richard Dershimer and John Goodlad, the incoming AERA president, discussed these matters and formulated a plan for an AERA colloquium. This idea fell on fruitful soil because AERA at that time was already engaged in long-range planning and had created a committee under the chairmanship of Ralph Tyler which had recommended that AERA separate itself from the National

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* We are grateful to Professor Carolyn H. Persell for her permission to quote this work.

Education Association in order to become more focused on scientific education research.

After a lengthy period of preparation, the colloquium actually occurred in 1968. Five major papers were presented:

> William D. Garvey, Carnot Nelson and Nan Lin: "A Preliminary Description of Scientific Information Exchange in Educational Research" — an empirical investigation of communication processes within AERA, which they compared with eight other professional associations.
>
> William Paisley: "The Role of Invisible Colleges" — this was a conceptual paper linking the concept of invisible colleges to a series of policy issues in educational research.
>
> Ronald G. Corwin and Maynard Seider: "Patterns of Educational Research: Reflections on Some General Issues" — which was based on a series of lengthy interviews with sociologists of science.
>
> Warren O. Hagstrom: Educational Researchers, Social Scientists, and School Professionals"
>
> Norman W. Storer: "The Organization and Differentiation of the Scientific Community: Basic Disciplines, Applied Research, and Conjunctive Domains: — This paper presents an overview of sociology of science findings and discussed what the author considered most appropriate and effective modes for connecting basic and applied interest.

Certain concepts, namely the notions of professional reward systems, communication systems, and their linkage to the quality of research as well as to the influence of the profession were utilized by AERA in developing its further policies. The resulting changes in the format of the annual meeting, in the introduction of recognition for research, and in the communications system were clearly a self-conscious attempt to inculcate into one professional organization a scientific and science organizational frame of reference built on the then-existing body of knowledge in the sociology of science.

Persell's case study provides good evidence that the impact of this deliberate, social science based effort to change both frames of reference and social frameworks for knowledge in the direction of greater scientific rigor was profound and far-reaching. It is interesting to note that the current leadership of AERA, working within an institutional framework that is at least in part the outgrowth of the events and planful action of the sixties, is hardly aware of the episode and of the role of the sociology of science in the history of their organization.[*] We may submit that this might be taken as an indication of successful institutionalization.

However this may be, the introduction of scientific knowledge bases into the education professions certainly is not unproblematic. While the frames of reference of educational researchers have been profoundly shaped by the intellectual developments in the field, the establishment of high quality research and development centers and laboratories, as well as the work of AERA that we refer to, very little of a similar nature has occurred in the profession of teaching, especially elementary school teaching. In our view, practical progress in effective knowledge utilization would require not only a comprehensive mapping of the frames of reference of the various educational professions, but also efforts at frame of reference critique and change and responses by schools of education and universities. Some part of these points are now being vigorously debated by deans of schools of education following an initiative by Hendrik Gideonse (1982).

We can offer in this paper, for the purpose of a concrete anchoring of our discussion, only sketches of the frames of reference of two particular role sets: elementary school techers and educational researchers. These sets are chosen because these frames of reference and social frameworks in which they are anchored are strategically significant for all educational knowledge utilization efforts and are linked by a great variety of channels. The discussion will concentrate in more detail on teachers than on researchers. This is so because much more is already known about the frames of reference of researchers and it is the classroom teacher who is the responsible professional on whom change strategies focus.

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[*] Based on personal conversations in 1982.

The working reality of teachers is perhaps best explored by Lortie (1975). Two more recent examinations, Huberman (1981) and Furth, et al. (1982) focus more particularly on those aspects of the teaching role which are of practical importance in considerations for improved knowledge utilization. Our own work (Leslie Salmon-Cox 1981) on teachers' uses of test information contributes particularly to an understanding of both how teachers conceive of their responsibilities and also the strategies they employ in assessing their own goal realization. Even more recent work on teachers and test use has served to confirm some of our findings (Beck and Stetz, 1980; Cooper and Leiter, 1980; Miehls and Meehan, 1982; Rice and Higgins, 1982).

Some more general statements are necessary before we can turn to the specific consideration of the components of teachers' reference frames. First, it should be remembered that teachers are practicing professionals who are provided only a relatively low degree of formal training by comparison to other professionals such as researchers, university professors, lawyers, or physicians. Most teachers enter the profession with a first college degree, many acquire later a second degree (but rarely a third one such as the doctor of education). This degree is normally received at the completion of what is universally agreed to be one of the least rigorous courses of study available within American higher education. (Sieber and Lazarsfeld, 1966; Gideonse, 1982). As teachers often point out, their "trade" is learned "on the job." This has direct and important consequences for the structure and especially the degree of articulation and codification of the profession's frame of reference. Much greater emphasis goes to implicitly learned practices and skills than to formally inculcated rules and rigorously structured theories. Thus, teaching is necessarily primarily a practical art.

Once assigned to a classroom, teachers work in an environment which is relatively isolated and private. Further, for a very substantial part of the time interaction with other adults is absent and the teacher exercises tremendous authority within the classroom. Even in large school districts with numerous ancillary personnel such as counselors, social workers, instructional supervisors, and others, most of a teacher's performances are unobserved and not evaluated by professional colleagues.

Rewards for teaching take two forms, external and internal. Internal rewards are of predominant importance. The externally provided rewards such as salary and status recognition acts are hardly of paramount attractiveness. Salary is referenced to years of service, and sometimes also to attainment of higher educational credits beyond the entry level requisites. Status recognition acts are of various kinds including, for example, assignment to special committees (frequently with the provision of released time from teaching and/or extra money), the award of funds for special instructional materials, etc. Teachers themselves usually cite internal rewards as being the most important ones. Even in the current time of sharply higher teacher salaries (when compared to those of past decades) teaching remains a relatively low income profession, reflecting undoubtedly societal appraisal of the profession as well.

Teachers who stay in the profession speak of the satisfaction they receive from the conduct of their work itself. They are rewarded by their experience that children—under their care and authority and through their work—have changed in a positive direction over the period of time the teacher has spent with them. This statement is purposively general, not specific to cognitive instruction, because teachers' goals are likewise not so limited.

Elementary school teachers do consider it their responsibility to help children develop both cognitive and social skills, with the latter category very broadly defined. We have found this orientation in a number of schools, regardless of the socioeconomic status of the community being served. Teachers talk with equal emphasis of helping children to learn to read and to share, to master arithmetic and citizenship skills, to develop self-confidence, independence, self-worth, along with elementary cognitive competencies. In relation to these points one needs to remember that many teachers, especially those in the primary grades, work in "self-contained" classrooms, overseeing a group of children for the entire day and being responsible for all that is transmitted during that day. This time/space dimension within which they work supports the holistic nature of their goal structure and it facilitates it.

As teachers' goals and responsibilities are broadly defined, the criteria they bring to bear in assessing goal realization must be multifaceted. We have found that test data, for example, are useful for only a small segment of performances teachers wish to assess. Consonant with the breadth and nature of their goals is the fact that much teacher assessment is based on observation of students and direct interaction with them.

In order to discuss this in more detail, let us consider now the components of frames of reference outlined in the earlier section of this paper as they apply to the frame of reference of elementary school teachers.

(1.) Frames of reference are anchored in commitment and responsibilities. In the highly trained professions we can speak here of a reference to the "code of inquiry," but we need to modify this in the case at hand. Elementary teachers are not so much inquirers as they are problem-solvers and their frame of reference is anchored in their definition of the scope of their responsibility. As noted above, this scope is usually broadly defined. Thus the anchor point of the frame of reference becomes commitment to teaching "the whole child" not just a specific subject matter.

(2.) Problem selection and formation: Teachers have very little power of situation control and thus have almost no latitude in the selection of problems to be solved, but they do exercise discretion over problem-solving emphases. That is, teachers are presented with a group of students, must accomplish a "year's worth of work," and do so with material tools such as textbooks, workbooks, tests, etc., which are usually not of their own choosing. But because they define their responsibilities so broadly, they do, in fact, shape the problem emphases to be solved. To the extent that they emphasize strongly social skills, for example, they include an area of accomplishment which requires of them expertise beyond that normally provided in materials form.

(3.) Strategies of problem solution: Teachers use a variety of techniques to instruct students ranging from the didactic lecture to the physical modelling of skills or behavior students are to acquire. Elementary teachers rely less heavily on techniques that necessitate students having long attention spans or sophisticated cognitive skills. An implication of this is also that the teacher is spending many hours a day isolated from other adults and engaged in forms of interaction quite different from standard interaction among adults.

(4.) Rules of inquiry: The cognitive style and indeed codes brought to practice in the classroom tend to be highly varied and personalized. Relatively little technical standardization can be observed which may in part be a function of the relatively low degree of formal training, but also a result of the need to manage an entire classroom as a continuous and personal performance.

(5.) Conceptions of the nature of facts: Because of their holistic orientation to the scope of their responsibility, vis-a-vis children, teachers take into account a large number of pieces of information about any given child. In this way, their conceptions of "facticity" are very broad. They often find equally compelling home background factors and notions of "inborn ability," as well as in a much more limited, way formal measurements.

(6.) Truth tests: The truth tests teachers employ rely heavily on pragmatic validation of ideas within the structure of their actual work. The thing to be assessed can range from a textbook to a teaching technique to a student reward system to a disciplinary procedure. New procedures or materials are probably best legitimated for teachers if it is possible to demonstrate that they have "worked" in a similar setting already, that is in a setting other than a laboratory or a special school. Within their own domain, teachers are inclined to most often employ techniques of their own making, such as teacher-made tests, observations, interactions to assess the educational outcomes.

(7.) Delimiting boundaries: Given the nature of basic responsibilities and commitments, the boundary lines that teachers draw are quite broad. Again, boundaries tend to be drawn in relation to practice. Time delimitations become particularly important—such as so many hours per day and per year of teaching. Conceptions of other frames of reference and relations to them tend to be of a diffuse nature.

(8. and 9.): Articulation, codification, and reflectivity: Teacher's reference frames are relatively low in the degrees of articulation and codification—an aspect of frame of reference structure that follows from the core resonsibilities. The emphasis on the craft orientation, the need to work in relatively private situations to achieve only broadly defined goals with pragmatically and experientially acquired skill hardly provide incentives for formal articulation and codification of the frame of reference. With regard to reflectivity, however, wide variation can be observed especially among those teachers who act as reform or change agents within their school.

This characterization of the frames of references of teachers to us has obviously predictive consequences for knowledge use. Items of knowledge, skills, techniques, must first enter into the frame of reference and into the domain of practice of teaching on terms compatible with its structure. We now turn to the consideration of the frames of reference of educational researchers.

This set of professionals is highly diverse. As we have described above, it is a domain in which deliberate efforts have been made to institutionalize frames of reference for the purpose of increasing the quality of scientific work, productivity, and communication. Because of the diversity within the educational research profession, we shall have to discuss it at the level of generalization that subsumes its many varieties. Yet, even at this level it is possible to sketch a compelling contrast between researchers'frames of reference and those of teachers. The comparison is especially useful because the significant differences between the two frame of reference sets have often been the unreflected-upon cause of difficulties in eduational efforts at knowledge use. In recent decades there has, however, been measurable progress in developing understanding of these difficulties. This is evidenced by both the creation of linkage organizations (Salmon-Cox, 1980, 1981; K. S. Louis, 1981; Lehming and Kane (eds.), 1981; Tyler, 1978; Teal, 1979; Sieber, 1974; Nash and Culbertson (eds.) 1977).

Educational researchers, on the whole, possess doctoral degrees and have undergone formal training of considerable duration. This training was provided either by schools of education or discipline-based graduate departments such as psychology or sociology. In their professional settings, while some researchers work individually, others in small groups, all encounter an environment reinforcing the research frame of reference. Researchers' work is formally communicated and frequently assessed by peers through the usual mechanisms for professional critique as in the assessments of proposals for funding, conference presentations, the reviews of books and articles.

The reward structure of researchers includes, of course, the external rewards of employment and salary, but essentially the rewards of professional recognition which are linked to increased access to research opportunities and occasions for professional communication. Performance goals in research are necessarily very specifically defined and the assessment of goal realization is tied to scientific creativity and methodological skill.

Again, a more precise picture will emerge if we briefly consider specifically the components of frames of reference as we have done already in the case of elementary school teachers.

(1.) Anchoring of the frame of reference in commitments and responsibilities: Researchers' reference frames are definitely anchored in a "code for inquiry" which they have been explicitly trained to employ through formal study and socialization. Their commitment is expected to be to problem-solving through means of replicable scientific methods.

(2.) Problem selection and formation: There are several ways in which research problems emerge or are presented to researchers. However, even in applied settings the researcher technically exercises considerable latitude in the conceptualization of the problem. Questions to be answered or problems to be solved may arise from the evolution of the basic disciplines, such as research questions that are considered at the "frontier" in psychology; contemporary societal demand (for example new ways must be found to increase the scientific literacy of young children); or the individual researcher's curiosity or quest for invention (for example the desire to produce a "talking typewriter" to facilitate language learning). Whatever the source of the problem, researchers are responsible for formulating it in such a way that within some feasible scope of effort it can be presumed to be solvable.

(3.) Strategies of problem solution: We find enormous variety and great debate about appropriate strategies. However, while they may range from labortory experiments to field based observations, intervention studies, or qualitative participant observations, all strategies share a commitment to public replicability and therefore require frame of reference articulation.

(4.): Rules of inquiry: Again we encounter very great variation of specific methodologies and investigative styles. We have earlier in this paper referred to the frame of reference study (Holzner, Mitroff and Fisher, 1976) which is one illustration of the diversity of modes of inquiry used by social inquirers as well as educational researchers. However, within the educational research community there is a normative emphasis on public argument in accord with empirical evidentiary rules and rational discourse. The ideal typical mode of inquiry of educational research is certainly the exact opposite of inquiry and problem solving that relies on purely experiential, personal, and private pragmatic validations.

(5.) Conception of the nature of facts: For researchers, the definition of "facticity" is relatively narrow. Information becomes fact if it is believed to have been generated through scientific, that is replicable, means. The contrast with elementary school teachers here is very strong: For example, scores of standardized tests are considered facts by researchers but certainly not always by teachers who interpret all test scores through a filter of personal observation and experience which gives the score its meaning to the teacher.

(6.) Truth tests: Researchers' truth tests are similarly science based. In some cases, statistical validity can be established to substantiate the veracity of a claim. Again, this is the very opposite of pragmatic modes of validation, since the claim that "something works" is only the starting point rather than the end for research.

(7.) Delimiting boundaries: The boundary definitions of researchers tend to be of the disciplinary variety, as in the case of the boundary of educational psychology, as well as of the problem focus type. Thus, boundaries for frames of reference in research vary according to the problems to be solved, ranging from very precise and narrow boundaries for a program of laboratory experimentation, to more widely drawn boundaries in the case of school-based program implementations. In any case, boundaries tend to be specifically drawn and are linked to judgments of knowledge relevance for research. A great deal of critical debate is focused on the boundary problem.

(8. and 9.): Articulation, codification, and reflectivity: As the work by Carolyn Hodges Persell which we cited above illustrates there has been a conscious effort on the part or the leadership of the educational research community to increase degrees of articulation, codification, and reflectivity. As a consequence, the past two decades have been years of demonstrable change in the direction of the scientific professionalization of the educational research community.

All of these aspects of the frames of reference in the educational research profession have direct implications for what knowledge gets used in the conduct of research work. The structuring of standards of judgment, truth tests, as well as the design of channels of communication, knowledge storage, and especially critique, are powerful influences in determining what body of knowledge and pieces of information a researcher includes in his consideration of how to shape and solve the problem before him.

Frames of Reference and the Prediction of Knowledge Use

We believe that the preceding discussions have shown good conceptual reason for the argument that knowledge of frames of reference can play a major role in an effort to understand and predict patterns of knowledge use. We have concentrated on the embeddedness of frames of reference in social organizations, that is in frameworks for knowledge. We have shown that the educational professions include widely divergent frames of reference and that, by implication, the linkage between research and the practice of teaching probably requires not only efforts at structuring linkage channels, organizations and roles, but also efforts at modifying the professional frames of reference to increase the knowledge reception capacity.

It is rather clear that individual frames of reference can be studied and described in detail, allowing the characterization of cognitive norms, preferences and directions that can be expected to be relatively stable for a given personality. Our focus was at the level of social organization. We have pointed out that frames of reference are anchored in central role responsibilities and obligate a professional to maintain the "perspective" of his or her profession and to deploy the knowledge skills acquired through professional training. In turn, these cognitive activities of the professional rely on organized knowledge resources, be these of the informal kind as in networks of personal consultants, or of the formal variety as in the case of specialized libraries, knowledge synthesis services, information systems. Further, we have emphasized that the structure of the frame of reference is tied into a system of critiquing and assessing knowledge claims, which in turn is usually articulated with the reward system and the channels of communication.

At the same time our discussion has also shown that the educational professions are unequal in the degree to which they have developed adequate social frameworks for working knowledge. Further, as an area of inquiry this domain has received insufficient empirical attention. Much of our evidence is of the observational and anecdotal variety and many of the studies that do shed light on the questions we ask were actually designed for quite different purposes. Much work remains to be done.

The area is important, because many of the strategies for knowledge use that have been employed in the past ignored the importance of frames of reference. Certainly, the "two communities" theory of knowledge use formulated by Nathan Caplan (1979) did improve the situation. However, our overview has shown that there are far more than two communities to be considered and that the consideration must be of a multdimensional variety. The frames of reference of "practitioners" certainly cannot be assumed to be terribly similar when we think of the enormous differentiation of the practioner communities in the field of education alone—it should be noted that our illustration focused on elementary school teachers. We would have expected to find some significant differences if in addition we had focused on high school teachers, for example. The systematic investigation of actual frames of reference in relation to knowledge should therefore be an important step in the planning of any major effort at improvement of professional practice and policy through the utilization of research based knowledge.

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XI METHODOLOGICAL CHOICES IN STUDYING KNOWLEDGE USE

William N. Dunn

Conceptual Choices
Dimensions of Knowledge
Dimensions of Use
Theoretic Choices
Alternative Classes of Phenomena-to-be-Explained
Alternative Classes of Phenomena that Explain
A Basic Typology
Procedural Choices
Conclusions

ABSTRACT

This paper offers a framework of methodological choices for studying knowledge use, choices which go much beyond the selection of particular methods and techniques. As such, it attempts to clarify the complexity in the field of knowledge use which has been conceptually soggy, theoretically fragmented and procedurally poor. Methodological choices require the systematic consideration of alternative ways to conceptualize, define and explain knowledge use, as well as procedures that facilitate the acquisition of information required to address problems and hypotheses posed in accordance with prior conceptual and theoretical decisions.

METHODOLOGICAL CHOICES IN STUDYING KNOWLEDGE USE*

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This paper examines methodological choices in studying knowledge use. The term "methodological choice" is intended, first of all, to call attention to opportunities for selecting new and more appropriate research procedures. There is now a large pool of potential procedural innovations (see Dunn and Holzner, 1982) from which knowledge use researchers have scarcely begun to draw. Second, and relatedly, the term "methodological choice" is intended to convey a special concern with the reflective evaluation of research methods and techniques, rather than "technical" choices per se. Thus, methodology is about some particular collection of methods and techniques; it is not itself one of the collection (Watzlawick, Weakland, and Fisch, 1974).

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The task of methodology is to raise to a level of self-conscious deliberation underlying assumptions that shape, often unknowingly, the selection of particular methods and techniques. Some of the most important questions confronting the study of knowledge use are, in this sense, methodological. What do we mean by knowledge when we set about to measure its use (Larsen, 1981)? Can we supply a persuasive definition of knowledge in general and, if so, does this general definition permit distinctions as to types of knowledge (Machlup, 1980)? What is the use of knowledge and how does it differ, if at all, from knowledge itself (Weiss, 1981)? Should the use of knowledge be defined in conceptual, instrumental, or symbolic terms (Caplan et al., 1975; Rich, 1977; Knorr, 1977)? On what basis can we distinguish "ordinary" and "scientific" knowledge (Lindblom and Cohen, 1979)? Answers to these questions, since they depend upon information not supplied by methods and techniques themselves, are methodological ones.

The main problem addressed in this paper may be stated as a question: How can we improve methodological choices in studying knowledge use? In addressing this question the first section of the paper explores conceptual choices among alternative definitions of knowledge use as a phenomenon-to-be explained. This section, by specifying some eleven dimensions according to which knowledge use may be defined, exposes the overly simple, narrow, and unconvincing character of many definitions now current in the field. The second section explores theoretic choices among alternative explanations of knowledge use. Here we consider two main types of explanations that focus, respectively, on the effects of imposed versus generated phenomena. We also note some principal variations within types--variations which focus on characteristics of knowledge users of knowledge, and the social systems of which users are members. The third section examines procedural choices among alternative methods and techniques. This section attempts to evaluate the appropriateness of existing research procedures. The result is a methodological conclusion: Some of the most widely used research procedures fail to provide information required to assess the empirical import of various conceptual and theoretical choices outlined in preceding sections. The concluding section presents a brief for multidisciplinary innovation as a way to improve conceptual, theoretic, and procedural choices in the study of knowledge use.

CONCEPTUAL CHOICES

A basic question about any field of inquiry relates to definitions of its subject matter. At present the field of knowledge use is conceptually "soggy" (Weiss, 1977: 11), a feature that makes it difficult to bound the field in convincing ways. As Ganz (1981: 186) observes, the field is now hampered by a "continued adherence to an 'iron triangle' between creation, diffusion, and utilization without reference to the complex interactions among these activities, institutional arrangements, and social change..." Thus far, there is no plausible theoretical foundation for linking elements of this triangle, while the "tangled literature" (Nelson and Winter, 1977) of the field as a whole reflects the absence of a minimal set of criteria for defining knowledge use as a dependent variable (Zaltman, 1980) or phenomenon-to-be-explained (Dunn and Holzner, 1981).

As the editor's introduction to the inaugural issue of Knowledge: Creation, Diffusion, Utilization made clear, the main reason for founding the journal was to provide a forum for linking individuals working independently on problems of knowledge creation, diffusion, and utilization (Rich, 1979: 3).

Under such conditions several alternatives are available to those who wish to organize the field in more coherent ways. One option is to elevate present difficulties to the status of an ontological principle, announcing that the "nature" of bureaucratic organizations, the policy-making process, or of knowledge itself imposes unalterable limitations on the creation of usable knowledge (Lindblom and Cohen, 1979; Knott and Wildavsky, 1980). The danger here lies in assuming that social systems are fixed entities whose establishment, maintenance, and change occur apart from the legitimating meanings and purposes of their members. Alternatively, we may acknowledge the complexity of knowledge use in contexts of practice, basing our views on ethnomethodological, phenomenological, or symbolic interactionist traditions (loosely, "qualitative" methodology) according to which knowledge and its use are unique indexical expressions (Knorr, 1982). Here we risk the abandonment of knowledge use as a "pseudo-problem" when, instead, it is an authentic problem whose generalizable dimensions we are unable to penetrate with tools now at hand. Finally, we may adopt on eclectic strategy, appropriating whatever concepts and models that may be available from existing social science disciplines and their subfields (sociology of knowledge, economics of information, cognitive psychology, cognitive anthropology) and hybrids (planned social change, social marketing, communication of innovations, information science, artificial intelligence). Here the major risk is an unreflective form of eclecticism that may accelerate the conceptual entanglement of the field.

Another alternative is to begin with the field as it is, taking conceptual diversity as a datum that may be organized in more manageable ways. This option not only permits a systematic review and assessment of competing definitions of knowledge use; it also precludes the premature adoption of favored definitions that, on further reflection, may prove to be inadequate. Indeed, we will find that knowledge use is not a unitary concept and, for this reason, that it is wrong to assume that when we describe a particular type of knowledge use--for example, conceptual or instrumental uses of scientific and ordinary knowledge--we are in fact talking about different versions of the same thing (cp. Rescher, 1969).

Dimensions of Knowledge

Taking its uses as given, knowledge may be conceptualized according to multiple dimensions that reduce to more orderly terms the diverse meanings attached to the term:

1. Subscribership Knowledge may be classified according to the persons or groups who subscribe to it. The dimension of subscribership includes such categories as "personal knowledge," "professional knowledge," "practitioner knowledge," "public knowledge," and so forth. In certain cases the use of knowledge may be virtually indistinguishable from subscribership, for example, when practitioners who subscribe to knowledge about managerial rules-of-thumb are also engaged, by definition, in acts of use which include the understanding and appreciation of that knowledge (Machlup, 1979: 63). Here knowledge and use are one and the same. Who subscribes to knowledge? Under what condition is the act of subscribing to knowledge identical to using it?

2. Source. Distinctions may also be based on the source of knowledge. Distinctions by source include "scientific knowledge," "professional knowledge," "craft knowledge," "practice knowledge," "experiential knowledge," "ordinary knowledge." Social scientists may be the source of knowledge while others subscribe to it, long after the same social scientists have disavowed their original claims. Conversely, social scientists may subscribe to knowledge whose source is practical, experiential, or ordinary. Source and subscribership should not be confused, since much "scientific" knowledge (subscribership) is in part "ordinary" knowledge (source) (see, e.g., Lindblom and Cohen, 1979). From what source did knowledge arise? Is the source different from the subscriber?

3. Object. Knowledge may also be classified according to its object. Distinctions by object include "economic knowledge," "political knowledge," "environmental knowledge," as well as knowledge whose objects are particular policy issue areas or sectors--for example, criminal justice, housing, welfare, education, and so forth. The use of knowledge tends to vary with the complexity of objects, such that some types of knowledge--for example, knowledge about experimental programs undertaken as part of the Great Society (see Aaron, 1978) seem to affect policymaking more than others--for example, knowledge about the criminal justice system (see Wilson, 1978). The object of knowledge is independent of its subscribership and source. What is the knowledge about? Are different types of knowledge, classified by object, associated with use?

4. Benefit. Knowledge may also be classified in terms of the types of benefits expected to occur upon its use. Machlup (1980), for example, distinguishes knowledge according to expected benefits which are "practical," "intellectual," "pastime," "Spiritual," and "unwanted." The expected benefit of knowledge is not the same as its object, since knowledge about a particular object--e.g., the politics of incremental policymaking--may confer benefits that are primarily intellectual (or spiritual) and only secondarily, if at all, practical. Moreover, the dimension of benefit is independent of subscribership and source. Professional knowledge (subscribership) based on experience (source) may be primarily intellectual or pastime knowledge (benefit) insofar as there is no expectation that its use will improve practice--bureaucratic routines, for example, are often valued intrinsically rather than for their consequences. In either case, however, it makes sense to talk about the "use" of knowledge. What difference will the use of knowledge make?

5. Purpose. Knowledge may be classified according to the type of purpose served by the realization of a benefit. Habermas (1971), for example, distinguishes purposes of "control," "understanding," and "emancipation." "Practical" knowledge (benefit) does not necessarily expand capacities for controlling the human and material environment (purpose), while "intellectual" and "spiritual" knoweldge (benefit) does not necessarily enlarge capacities for understanding and emancipation (purpose). In many cases the realization of practical benefits by using knowledge

about social problems (race relations, substance abuse, rape, delinquency, suicide, alienation) seems to have distorted our understanding of problems, as experienced by victims, and depressed capacities for emancipating social scientists and practitioners from tacit assumptions and theories that impair the realization of human potential (see Gregg et al., 1979). Moreover, the purpose of knowledge is independent of its subscribership, source, and object. The professional knowledge of successful managers (subscribership), based largely on practical experience (source) with complex organizations (object), may be oriented as much towards understanding the perspectives of organizational members and challenging their tacit assumptions as it is towards technical control. Apart from expected or actual benefits of using knowledge, does the realization of such benefits serve purposes of technical control? Of human understanding? Of emancipating individuals and collectivities from hidden assumptions that impair reflective choices?

6. Warrant. Knowledge may be classified according to the types of assumptions that warrant its certification as knowledge (Toulmin, Rieke, and Janik, 1979). Knowledge-warranting assumptions may be empirical, analytic, teleological, pragmatic, authoritative, ethical, pragmatic, and so forth. Warrants for knowledge ("reality tests") are organized in frames of reference or cognitive maps that affect and are affected by social frameworks (Holzner and Marx, 1979; Weiss and Bucuvalas, 1980). These warrants represent standards, criteria, or rules for

assessing the adequacy, relevance, and cogency of knowledge claims (Dunn, 1982). The type of warrant used to certify knowledge is potentially independent of its subscribership, source, object, benefit, and purpose. "Practitioner knowledge" (subscribership) may be based on the same kinds of warrants employed by social scientists; and there is no necessary relationship between the source of knowledge (e.g., every day experience) and its theoretical adequacy or practical relevance (Zaltman _et al._, 1982). The expected benefits and purposes of knowledge would appear to be a function of the knowledge-warranting assumptions of different subscribers. What makes something count as "knowledge" in the first place?

Dimensions of Use

Once we have chosen an appropriate definition of knowledge, an effort that surely will involve several dimensions outlined above, we can proceed to specify what it means to say that such knowledge is "used." This task may seem relatively straightforward, since we can simply look at the decisions made by users--for example, policymakers, managers, clients, social scientists, members of society-at-large--and determine whether such decisions are based on a particular type of knowledge. Yet the concept of use, like that of knowledge, is by no means a unitary one; users, to paraphrase Carol Weiss, do not utilize knowledge the way they utilize a hammer (Weiss, 1981: 18). Hence, use may also be conceptualized according to multiple dimensions:

1. Usership. Taking the content of knowledge as given, use may be classified according to the persons or groups who constitute users of knowledge. Users may be national or local policymakers, members of professional associations, media representatives, client groups, social scientists, and so forth. While it is difficult to imagine users who are not also subscribers, it often happens that some users subscribe to knowledge for reasons that differ from those of subscribers--for example, policymakers may use results of evaluation research to support their own personal or political ambitions, thus subscribing to knowledge for reasons that are quite different from those of program evaluators. Under these conditions we might speak about the "misutilization" of evaluation research (Cook, Levinson-Rose, and Pollard, 1980). Apparently simple issues such as this one are difficult or impossible to resolve, it seems, without also addressing the expected benefits, purposes, and warrants of knowledge. Who are the users of knowledge?

2. Object. Use may also be classified according to its objects, which may include recommendations, empirical generalizations, hypotheses, theories, models, concepts, assumptions, principles, ideas, and so forth. The object of knowledge use and the object of knowledge differ, since knowledge classified by object (e.g., "political" knowledge) implies nothing about the object of use (e.g., policy recommendations versus political ideas). Moreover, choices involving different objects of use would appear to depend on variations in expected benefits and purposes of knowledge, as well as knowledge-warranting assumptions. What is being used? Why?

3. Directness. Use may be classified according to its directness to an original knowledge source. Use may be relatively direct, in cases where some user reads an original report or study produced by a social scientist, or indirect. Indirect use occurs when research findings are filtered through executive summaries and secondary written descriptions or reviews, or passed on through conversations that involve no face-to-face interaction ("invisible colleges"). How close is the use of knowledge to its original source?

4. Temporal Proximity. Use may be classified according to its proximity in time to an original knowledge source. Apart from its directness, use may be immediate, occurring simultaneously with the creation of knowledge--for example, when subscribers are also the source of knowledge they would appear to engage in immediate use. Use may also be delayed, as when knowledge is transmitted across years, periods, generations, or historical epochs. The concept of "diffusion time" is a specific variant of temporal proximity, as is Keynes' statement that policymakers are the slaves of some defunct philosopher. How immediate is the use of knowledge?

5. Magnitude of Expected Effects. Use may also be classified according to the magnitude of its expected effects. Use may refer to "conceptual" and/or "instrumental" effects, categories which appear to be points along a single continuum or dimension, rather than discrete and mutually exclusive classes. In this context, Machlup (1980) describes thirteen elements of

the state or act of knowing which specify, in part, what is meant by the magnitude of expected effects of use. These elements include acts of knowing that range from being acquainted with or aware of something to being able to explain, demonstrate, talk about, or perform some action. One of these effects (i.e., the acquired capacity to perform some action) is clearly "instrumental," since it implies action, while others seem to be "conceptual." None, strictly speaking, are behavioral. Yet being able to explain or demonstrate something--for example, explaining or demonstrating that social experiments have certain effects--is instrumental to being able to perform and actually taking actions that will alleviate some social problem. For this reason, the expected effects of using knowledge are best conceptualized as a hierarchy of requisites similar in form to a unidimensional (Guttman) scale whose poles are being acquainted with something and actually performing some action. Finally, the concept of "symbolic" use (Knorr, 1977) appears to refer to the expected benefits and/or purposes of knowledge, rather than to the magnitude of expected effects per se. How much effect is required to count as "use?"

THEORETIC CHOICES

The striking feature of these eleven dimensions, when considered as a choice set from which one may select definitions, is that few questions about knowledge use may be answered without making reference to the internal cognitive states of users. Simple questions about subscribership, usership, and source, as well as more complex issues surrounding benefits, purposes, warrants, and expected effects, are difficult or plainly impossible to answer by reference to overt behavior alone. For this reason it makes much sense to conceptualize knowledge use in terms of "historical semantics, trying to find out what people mean (or meant) when they say (or said) something, not what they ought to mean (or ought to have meant)" (Machlup, 1980: 38). At the same time the overt behavior antecedents and consequences of knowledge use -- antecedents and consequences which involve individual as well as collective behavior -- must also be addressed.

Alternative Classes of Phenomena-to-Be-Explained

In order to outline theoretic choices we must first attempt to provide answers to two questions (cp. Wallace, 1969): (1) How is knowledge use to be defined? (2) How is knowledge use to be explained? The first question leads towards alternative definitions of knowledge use as a phenomenon-to-be-explained (explanandum), while the second yields alternative classes of phenomena available to explain knowledge use (explanantes). By pursuing both questions at once we may avoid difficulties that arise when two or more theoretical perspectives based on a common definition of knowledge use -- for example, a definition in terms of expected instrumental effects -- also offer fundamentally different explanations. The same situation may arise in reverse when two or more theoretical perspectives are based on a similar explanation of entirely different phenomena. Accordingly, conflicting research findings and conclusions are not due solely to primarily to an absence of definitions of use, or even to a failure to employ multiple measures of the same phenomenon (Larsen, 1981: 151), but to the presence of mixed and/or conflicting definitions and explanations of knowledge use.

Multiple dimensions of knowledge use reviewed in the last section seem to share one property in common: Knowledge use is a cognitive relation. By specifying that knowledge use is a "cognitive" relation we mean that the accompaniment of one actor's behavior by that of another is somehow based on the act or faculty of knowing. Indeed, it is this cognitive stipulation, and perhaps this alone, that differentiates knowledge use from disciplines or fields that investigate other types of relations based, for example, on power, status, or exchange. Accordingly, any satisfactory definition of knowledge use would appear to hinge on the cognitive properties of "knowers" or "users" (see Churchman, 1971).

As a cognitive relation knowledge use may be defined in two fundamentally different ways: one type of definition emphasizes overt and directly observable cognitive relations, while the other stresses cognitive relations which are covert and indirectly observable. The difference between these definitions, as Wallace (1969: 6-7) observes of social relations in general,

> corresponds to the difference between the Newtonian and Weberian definitions of "action." Newton's definition of mechanical action was entirely in terms of external observables... Weber took exactly the opposite view by asserting that bodies' social action is so far distinguishable from mechanical action as to be definable only in terms of their internal states.

The distinction between overt and covert relations is, of course, somewhat ambiguous. One source of ambiguity is the technical difficulty of directly observing subjective states (e.g., knowledge, attitudes, values). Another technical difficulty, however, is determining whether overt behavior does or does not reflect particular cognitive properties -- for example, knowledge of policy recommendations or the findings of program evaluations. For this reason Merton (1949), Suchman (1972), Weiss (1977), and Rein and White (1977) have called attention the the "latent" goals of policy research. Often it is even more difficult to make inferences about "knowledge use" from overt behavior than it is from subjective states.

The definition of knowledge use as a covert cognitive relation is evident in the literature of the field. House (1981: 12-13), for example, recommends that investigations of knowledge use in education be "directed at the different 'meanings' produced by the change efforts rather than at the change itself," citing an example where an unsuccessful attempt to introduce PPBS was accompanied by extensive culture conflict (see Wolcott, 1979). Similarly, Aaron (1978: 159) stresses that the use of research and experimentation on poverty, while it is seemingly unconnected to overt changes in the behavior of policymakers, nevertheless "corrodes" the king of simple faiths on which political movements are built." In the same vein, Patton's work on utilization-focused evaluation defines knowledge use in terms of "more penetrating perspectives, increased capabilities, and greater commitments to action" (Patton, 1978: 290). Caplan, while acknowledging the importance of "instrumental" use, stresses the importance of covert cognitive relations found to characterize "conceptual" use among high-level policymakers confronted by complex macro-level problems (Caplan, 1979: 465).

In contrast to an emphasis on covert and indirectly observable cognitive relations we find those who stress relations that are overt and directly observable. Here there is no direct reference to underlying purposes, benefits, or knowledge-warranting assumptions. Thus, for example, knowledge use has been viewed as an overt process of adopting and implementing research-based innovations (National Institute of Education, 1978), or as a change in the structure and functioning of a social system (Rogers, 1973). These definitions of knowledge use, which emphasize directly observable cognitive relations, assume that use occurs when an entire set of recommendations is implemented in a form suggested by researchers (Larsen, 1981: 150).

Another definition of knowledge use in terms of overt cognitive relations is provided in a study of the use of evaluation research in criminal justice. Noting that "evaluation is a process that produces information to assist in the allocation of resources," the authors go on to define use in terms of the "decision-consequential impact" of research (Larsen and Berliner, 1979: 2). Quoting Howard (1966), the authors contend that "a decision is not a 'decision to make a decision,' but rather the concrete action implied by the decision" (Larsen and Berliner, 1979: 23n). This definition, and others like it, provides evidence that the term "overt cognitive relation" is not a self-evident contradiction. While we may disagree with such definitions it is important to recognize that many observers assume (often implicitly) that overt and directly observable behavior indicates, suggests, or implies acts of knowing.

The distinction between overt and covert cognitive relations provides a simple bases for comparing and contrasting, in gross terms, alternative definitions of phenomena-to-be-explained. Clearly, however, dimensions of knowledge use reviewed in the last section permit many additional distinctions, many of which have been made in available literature (e.g., Larsen et al., 1976; Weiss, 1976; Hall and Loucks, 1977; Caplan, 1979; Dunn, 1980; Knott and Wildavsky, 1980; Zaltman, 1980; Rich and Goldsmith, 1981). Perhaps most appropriate position towards these opportunities for choice is simply to argue that the overt-covert distinction captures many of the most important definitions current in the field. The overt-covert distinction may help clarify essential properties of more complex classifications. For example, Knott and Wildavsky (1980: 546) propose a seven-fold typology of "standards of knowledge utilization," some of which (e.g., cognition and reference) conform to what we have defined as covert and indirectly observable cognitive relations, while others (e.g., implementation and impact) are instances of relations that are overt and directly observable.

Alternative Classes of Phenomena that Explain

Apart from their different emphases on overt and overt cognitive relations, theoretic choices may involve different classes of explanatory phenomena. Theoretic choices made on the basis of some common definition of knowledge use as a covert cognitive relation (e.g., "conceptual" use) frequently involve different explanations of this same phenomenon -- for example, explanations derived from knowledge-specific, policymaker constraint, or two-communities theories of knowledge use (see Caplan, Morrison, and Stambaugh, 1975). A similar situation may exist in reverse, since authors who share the same explanatory schema -- for example, an interactive, pluralistic, and incremental theory of policy-making -- may hold fundamentally different defintions of knowledge use. Thus, while Lindblom and Cohen (1979: 12) affirm that "knowledge is knowledge to anyone who takes it as a basis for action," Wildavsky (1979: 27-28) and Knott and Wildavsky (1980) reserve the term "knowledge" for

> ...theories relating policy variables to effects where the principles are confirmed by the empirical test of repeated decisions... When policy makers are certain that manipulating these variables will produce the expected effects -- that is, if "x" is done, "y" will follow with a known probability -- then they have knowledge (547, 546. Emphasis supplied.).

Whatever else one may say about these two interactionist explanations of knowledge use, their authors hardly share a common theory -- they attempt to explain entirely different phenomena.

The principal phenomena offered to explain knowledge use may be grouped into two main classes: conditions that are imposed on users by the given nature of knowledge, of users themselves, or of the social system of which they are members; and conditions that are generated by users who create knowledge, develop their own standards for assessing knowledge, or who participate in social systems where knowledge is produced. The first type of explanation implies that knowledge use is "natural," "determined," or "imperative," while the second suggests that knowledge use is "artificial," "self-determining," or "constructed."

Theoretic choices stressing imposed phenomena are sometimes made by those concerned with the nature of social science knowledge and its effects on research utilization. For example, Bernstein and Freeman (1975), observing that "there have been few cases of actual effective utilization of evaluation research for expected purposes" (5), offer an imposed explanation based on assumed characteristics of "quality" research and the attendant failure of federal agencies to ensure its production. "Quality" research is defined as research that conforms to standards of quasi-experimental design (100-101), while the failure to enforce such standards is described in the following terms:

> ...there is neither a federal evaluation policy nor a set of requirements and guidelines regarding what constitutes an appropriate evaluation. This lack has severe consequences. It results in a failure to enforce any standardized set of evaluation requirements, even when present in legislation (Bernstein and Freeman, 1975: 6)

Whereas Bernstein and Freeman explain knowledge use in terms of imposed properties of knowledge, others stress explanations based on properties that have been imposed on users or their environing social systems. For example, Mitroff and Mitroff (1979) employ Jungian personality theory, which assumes given underlying personality structures or traits, to explain patterns of interpersonal communication among knowledge users and producers. Whereas this explanation focuses on imposed user-specific characteristics, others stress phenomena that operate through social systems. For example, the weight of arguments offered in support of theories of a "post-industrial" society (Bell, 1976) is borne by explanations that stress imposed system-specific characteristics -- particularly, the claim that the growing interdependencies, complexity, and pace of change of contemporary society make existing knowledge obsolete, thus increasing the demand for new forms of policy-relevant knowledge (see Straussman, 1976).

Theoretic choices are also based on explanations that emphasize phenomena which are generated by users as they create knowledge, develop their own standards for assessing knowledge, participate in social systems which produce knowledge. For example, Carol Weiss outlines three classes of generated phenomena which parallel distinctions among knowledge-specific, user-specific, and social system-specific characteristics: knowledge-driven, decision-driven, and interactive models of knowledge use (C. Weiss, 1977: 11-14). In her own work Weiss has offered explanations based primarily on phenomena generated by users -- specifically, the truth tests and utility tests that constitute the frames of reference of decision makers (Weiss and Bucuvales, 1980). Whereas Lindblom and Cohen (1979) are concerned with knowledge-specific characteristics in general -- that is, with relations between "ordinary" and "scientific" knowledge -- Weiss and Bucuvales specifically address knowledge as a product of user-specific frames of reference. That they are not principally interested in social system-specific characteristics is evident in their description of their enterprise as a classical sociology of knowledge "turned upside down" (see Holzner, 1978: 8):

> Whereas the classical sociology of knowledge was concerned with the social bases of intellectual productions, a sociology of knowledge application would be concerned with the social consequences of knowledge... /there is a/ need for understanding the multiple frames of reference with which actors perceive knowledge and the discrepancies between the frames of reference of knowledge producers and knowledge users (Weiss and Bucuvalas, 1980: 302).

Finally, other explanations place primary emphasis on phenomena generated by social systems. Janet Weiss argues that attention to "relationships between the structures of policymaking and the avenues by which social science may participate in policy debates permits analysis of both the overall level of social science use that sectoral arrangements seem to support and the particular kinds of use that sectoral arrangements encourage" (J. Weiss, 1979: 439). Caplan provides a similar explanation by stressing generated phenomena that also operate through social systems: "social scientists would be well advised to pay particularly close attention to the utilization theories that stress the lack of interaction between social scientists and policymakers as a major reason for nonuse" (Caplan, 1979: 561; see also Caplan, Morrison, and Stambaugh, 1975; and Poppen, 1978).

A Basic Typology

The intersection of definitional and explanatory dimensions outlined above yields a basic typology of theoretic choices (Figure 1). The product of the typology is four ideal types labelled with terms that describe the essential features of competing definitions (explananda) and explanations (explanantes), as these have been discussed so far, rather than disciplinary orientations (e.g., "philosophy of science" or "sociology of knowledge") or preferred metaphors (e.g., "two-communities theory").

One major set of theoretic choices may be designated "behavioral imperativism," which defines knowledge use in primarily overt (behavioral) terms and offers explanations that stress phenomena that are imposed on users (imperative). The work of Knott and Wildavsky (1980) closely approximates "behavioral imperativism," as we have characterized this perspective, since their theory of dissemination and knowledge use holds that the overt and observable utilization behavior of policymakers is a function of the availability of "authentic" knowledge developed through "natural" processes. Specifically,

> ...premature dissemination in the absence of knowledge contributes to information overload, thus making dissemination of cause of underutilization rather than a cure. Dissemination should not substitute for supply when natural processes are cheaper and more effective ... Three difficulties stand out: pretensions to knowledge, which make many dissemination efforts pre-

Figure 1

A BASIC TYPOLOGY OF THEORETIC CHOICES

		The principal Cognitive Relations that Define Knowledge Use Are:	
		BEHAVIORAL (Overt)	CONCEPTUAL (Covert)
The Principal Phenomena that Explain Cognitive Relations are:	IMPOSED ON USERS (Imperative)	BEHAVIORAL IMPERATIVISM	CONCEPTUAL IMPERATIVISM
	GENERATED BY USERS (Constructed)	BEHAVIORAL CONSTRUCTIVISM	CONCEPTUAL CONSTRUCTIVISM

> mature; artificiality (or the Newcastle syndrome) substitutes unnecessarily for the natural spread of knowledge; and the Mathew effect in which those policy makers who are the most in need of dissemination are also the ones who are the least able to process and apply what is sent (Knott and Wildavsky, 1980: 573, 574).

A second set of choices, "conceptual imperativism," defines knowledge use in essentially covert (conceptual) terms and provides explanations that stress phenomena that are imposed on users (imperative). Machlup (1980) approximates conceptual imperativism, as we have defined it, since the emphasis is on a "knowledge industry" constituted by given structures of production and occupational specialization which create new and diverse forms of knowledge. While "for most parts of the production of knowledge no possible measure of output can be conceived that would be logically separate from a measure of input" (Machlup, 1980: 225), the class of imposed phenomena used to explain knowledge and its use are based on

> an industry approach to the total value of the output of all firms, agencies, departments, etc., that generate or disseminate knowledge, and an occupation approach to the amount or value of the input of knowledge producing labor (Machlup, 1980: 227).

A third choice set, "behavioral constructivism," defines knowledge use in primarily overt (behavioral) terms and supplies explanations that stress phenomena that are generated by users (constructed). Behavioral constructivism is evident in explanations that stress "the symbiotic relationships among policy actors, knowledge, and the political and institutional context of policy making" (J. Weiss, 1979: 456-57). The use of knowledge by policymakers

> cannot be understood independently of the processes for making public policy. These processes provide the critical organizational and political contexts that shape policymakers' needs for outside expertise; create organizational channels of information flow that routinely bring (or fail to bring) ideas and evidence to policy makers' attention and define problems, decision situations, policy alternatives, and solutions in ways that determine which evidence is considered to be relevant (J. Weiss, 1979: 439).

The fourth set of theoretic choices, "conceptual constructivism," is best represented by the work of Knorr (1981). Conceptual constructivism defines knowledge use essentially covert (conceptual) terms and offers explanations that stress phenomena that are generated by users (constructed). For Knorr, contexts of practical action are radically under-determined by generalizable standards or rules. As such, practical action is indexical:

> ...rules and decision criteria, and more generally definitions of the situation, are interpreted in context...it is the concrete, local translation of rules or decision criteria which determine the selections that are made, and which subsequently shape the outcomes of these selections (Knorr, 1981).

Clearly, these four sets of theoretic choices are highly general ones; they do not capture the range of particular assumptions, propositions, or hypotheses put forth in alternative theories of knowledge use. For this reason it is desirable to differentiate the basic typology into additional subclasses of explanations. This yields a twelve-fold typology based on additional distinctions among knowledge-specific, user-specific, and social system-specific phenomena (Dunn, 1981).

PROCEDURAL CHOICES

Procedural choices involve the selection, adaptation, or development of research methods and techniques. Procedural choices, however, are dependent on prior conceptual and theoretic decisions. The choice of a particular method (e.g., ethnographic interviews) or technique (e.g., multidimensional scaling) represents a means for operationalizing prior conceptual and theoretic choices. A key methodological issue is whether available research procedures provide information required to explore and/or test hypotheses that may be derived from the basic typology of theoretic choices presented in Figure 1. Another important question is whether available procedures yield information about the eleven dimensions of knoweldge use discussed in the first section of this paper. Are given procedural choices appropriate for the kinds of conceptual and theoretic decisions that may be made in conducting research on knowledge use?

Available research methods and techniques for studying knowledge use are largely inadequate. This is one of the main conclusions of a methodological research project on knowledge use and school improvement that is being carried out with the support of the National Institute of Education. This project, among its other objectives, has involved an extensive search for research procedures that may facilitate improvements in knowledge use research carried out in areas that range from education and mental health to criminal justice, local government, and the social and economic development of Third World countries. The main product of this research effort is a volume (tentatively) titled Handbook of Knowledge Utilization: Assessing the Impact of Research and Development in Education and the Social and Behavioral Sciences. Major portions of the volume are available in draft from and its table of contents is appended to this paper.

The approach to developing the handbook has involved several kinds of activities. Since one of our aims is conceptual and theoretical, we have invested a good deal of effort in reviewing, assessing, and attempting to develop alternative conceptual frameworks and models. Yet we are also concerned with methodology and, for this reason, we have also reviewed, assessed, and attempted to develop alternative research methods and techniques.

In reviewing available research procedures we began with traditional literature reviews. Concurrently, we consulted with members of several overlapping research networks (NIMH, NSF, NIE), asking them to provide copies of questionnaires, interview schedules, coding schema, analytic routines, and so forth. In addition, we reviewed available compendia of research procedures in the social and behavioral sciences and searched a major archive of instruments to measure creativity and innovation. Altogether, we attempted to contact more than 100 researchers in the field and acquired, directly and indirectly, more than 200 "candidate procedures." We eventually narrowed this larger set to some 84 procedures that include content analysis, questionnaires and interview schedules, observational schema, tests, case analysis routines, and scales and indices (see Appendix, Part III).

Thus far, we have used two criteria for including procedures in the handbook: reproducability and face relevance to knowledge use. The criterion of reproducability required that a given procedure be sufficiently specific, regular, and orderly that its steps could be repeated by some other researcher. By using this criterion of inclusion we lost a large number of "candidate procedures;" much published literature on knowledge use does not meet this standard. In some instances--especially, those involving "qualitative" methods--researchers explicitly challenge or disavow the appropriateness of reproducability as a criterion.

The second criterion--face relevance to the study of knowledge use--required judgments about the conceptualization of the field. Here we were guided by the general consideration that procedures should permit the acquisition of information about multiple dimensions of knowledge use; that procedures should be appropriate for investigating alternative theories; and that procedures should somehow tap cognitive properties, since it is this feature that provides the field with a unique mission and identity. The criterion of face relevance, when applied to research on knowledge use proper, resulted in the inclusion of some 46 procedures; an additional 38 procedures were included as relevant, even though they had not been developed or used by researchers who consider themselves part of the field.

Although we are still in the process of selecting procedures for inclusion in the handbook, it is possible to offer some preliminary methodological findings:

1. Reproducability: One of the striking features of published and unpublished research is the relative paucity of reproducible procedures. For example, many case studies and interviews are not based on steps that are sufficiently definite, regular, or orderly to be replicated by others in the same or different contexts.

2. Replicability: Even where procedures are reproducible, there are few instances where the same procedure has been used by two or more investigators. Ironically, knowledge use researchers seem to use knowledge generated in the field no more than colleagues in other disciplines and fields. Individual investigators develop and use their own procedures; consequently, there is little cumulative growth of research findings.

3. Conceptualization: More than one-half of studies based on reproducible procedures define knowledge use conceptually, or both conceptually and instrumentally. All remaining studies define use instrumentally and, among these studies, none focus on the expected benefits, purposes, or knowledge-warranting assumptions of users themselves. Among studies based on a conceptual definition of use, few address expected benefits, purposes, or warrants. Only 8 of 42 studies focus on underlying assumptions or meanings of users. For this reason, few studies (at least those based on reproducible methods) are "qualitative" in the specific sense that they address questions surrounding the subjective interpretations of users.

4. Units of Analysis. Individual users are the predominant unit of analysis; collective properties are inferred by aggregating individual data. Few procedures are available for mapping collective cognitive properties. While the term "network" is part of the basic vocabulary of the field, there appear to be few applications of network analysis as a set of reproducible procedures for mapping cognitive relations among users ("epistemic networks").

5. Reliability and Validity: More than one-half of the studies for which reliability data are appropriate report such data. Nearly all studies that employ testing and content-analytic procedures report reliability data; less than half of studies using questionnaires and interview schedules report reliability data. Overall, there have been few attempts to establish the validity of constructs, even though such procedures--since they are specifically designed to examine the status of mental constructs of all kinds, including cognitive ones--are clearly central to the study of knowledge use.

CONCLUSIONS

At present the field of knowledge use is conceptually soggy, theoretically fragmented, and procedurally poor. This paper has attempted to supply a framework of methodological choices for studying knowledge use, choices which go much beyond the selection of particular methods and techniques. Methodological choices require the systematic consideration of alternative ways to conceptualize, define, and explain knowledge use, as well as procedures that facilitate the acquisition of information required to address problems and hypotheses posed in accordance with prior conceptual and theoretic decisions.

By attempting to enlarge the domain of methodological choice this paper may have produced a greater sense of the complexity of studying knowledge use, hopefully, by clarifying rather than complicating this complexity. A paper of this kind does not justify conclusions not already made in the text. Accordingly, it may be appropriate to end the paper with a plea for methodological innovation. We need to adopt, adapt, reinvent, and institutionalize concepts, theories, and procedures developed elsewhere and among ourselves. A familiar theme.

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